AUGUST 2, 1958
VOL. 155—NO. 5

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY

GAS PRESSURE

Employes of Winter Park (Fla.) Telephone Co. repair gas pressurized submarine cable in lake. Damage caused by a gig. Gas pressure drop indicated hole in sheath 25 feet from shore.

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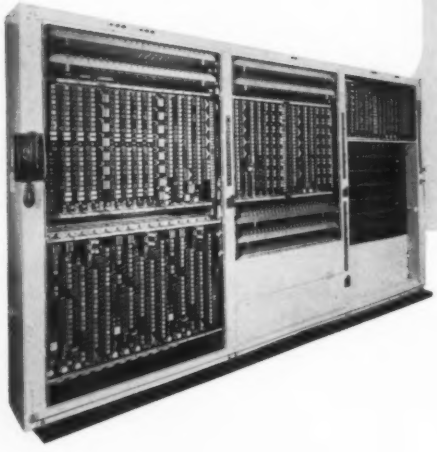

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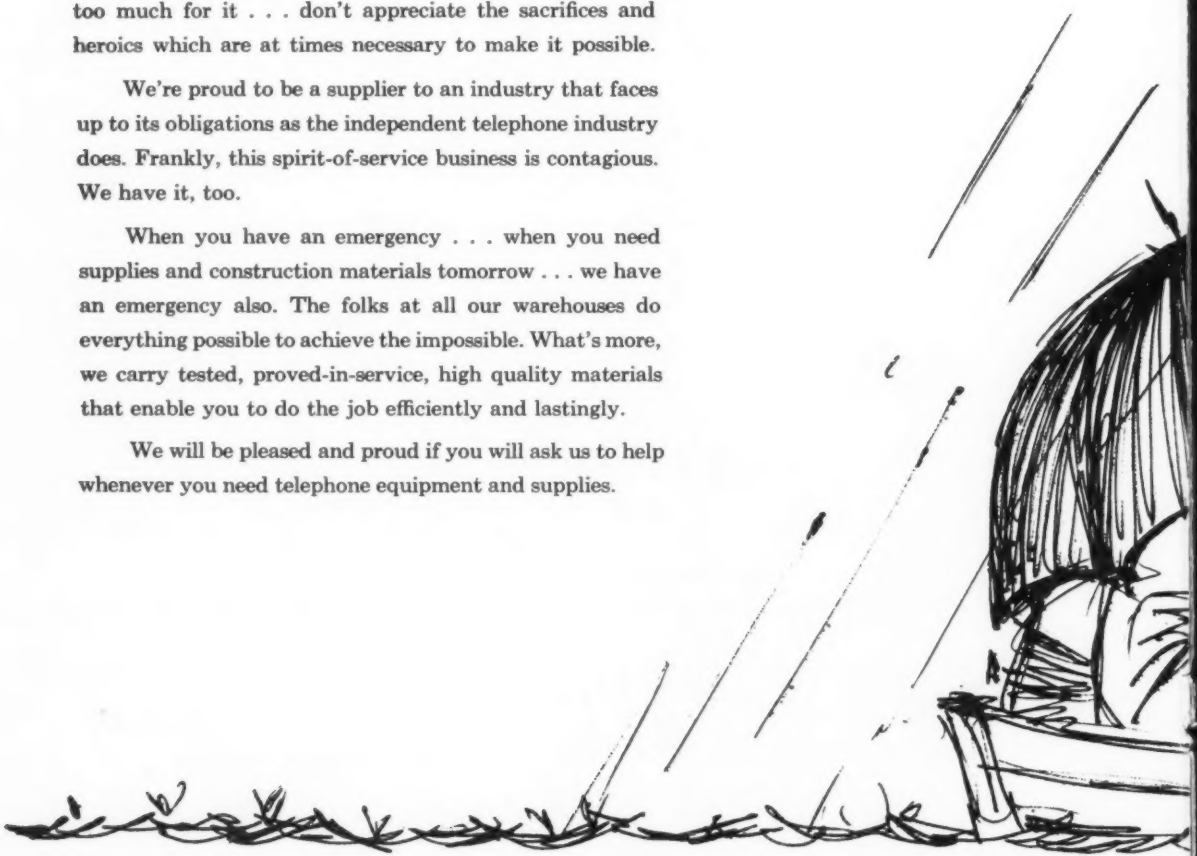

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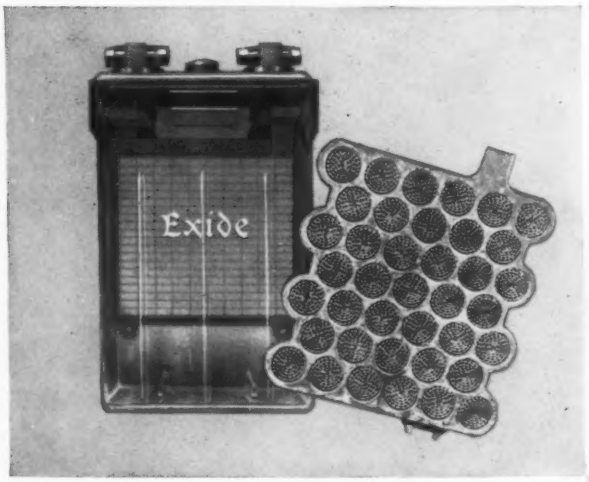

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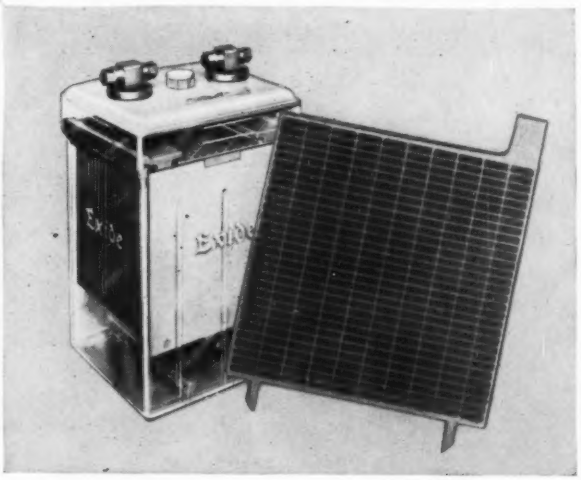

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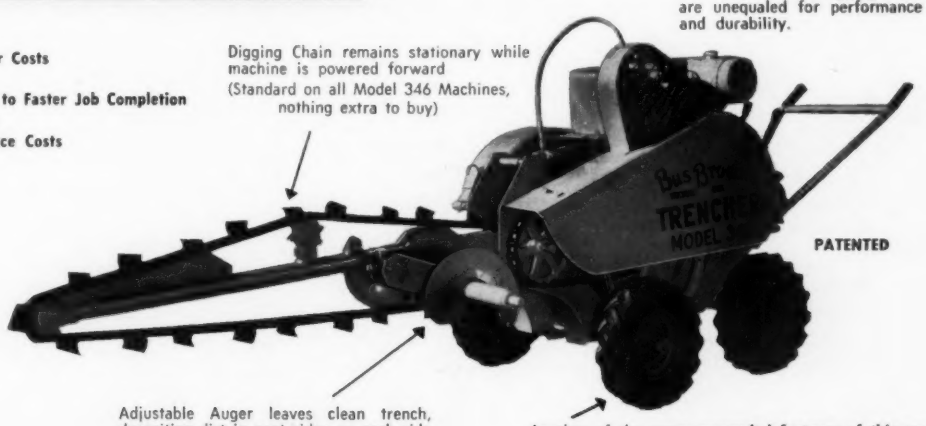

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FLASHES AND PLUGS

SANDY SAGA. A glorious weekend had an atypical ending recently for three girls, employes of the Southern Bell Telephone & Telegraph Co. at Memphis, Tenn.

The gals, Mrs. Kathleen Tutor, Miss Eunice Byrd, and Mrs. Faye Paine accompanied by a fellow worker, Mrs. Mary Ralston, and Mrs. Betty Gatti, a friend, left Memphis on a Friday to weekend on the Gulf Coast.

They arrived in Biloxi early Saturday morning and found accomodations at two hotels. Mary and Betty went to one near the bus station. Kathleen, Eunice and Faye went (this is significant) to one a long distance from the bus station.

All Saturday they enjoyed themselves swimming in the gulf. On Sunday, they planned a trip to nearby Ship Island. They then planned to leave on a return bus to Memphis at 8 p.m.

Kathleen, Eunice, and Faye thought of an idea to save time. They got up early on Sunday morning, put on their bathing suits, and checked out of their hotel. They took their bags to the bus station, which is equipped with showers. This plan would enable them to get the most out of every minute and they could dress at the station just before the bus left.

They had a wonderful time that Sunday and finally returned to the bus station, in their bathing suits, ahead of schedule planning on claiming their bags.

The bags were gone.

Memphis was 400 miles away and they had to be back at work at 8 Monday morning.

It was a tough decision to make but duty beckoned and when the bus for Memphis left, Kathleen, Eunice, and Faye were inside —outfitted for traveling in wet bathing suits and smelling of shrimp.

To top off everything else, the bus was air-conditioned and the gals soon started freezing. At Gulfport, the driver had pity on them and borrowed some Army blankets at the bus station.

The whereabouts of the bags were still unknown. The girls worried about their missing luggage from Biloxi to Jackson, Miss. and at Jackson found that their bags were waiting for them at Memphis.

The night was long and people kept getting on and off the bus. Every rest stop created a new sensation. It isn't often the local populace sees three sandy, bathing-suited young ladies get off a bus.

The ladies reached Memphis at 6:30 a.m., found their bags, changed at the station—and made it to work on time.

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Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY
Since 1901

August 2, 1958

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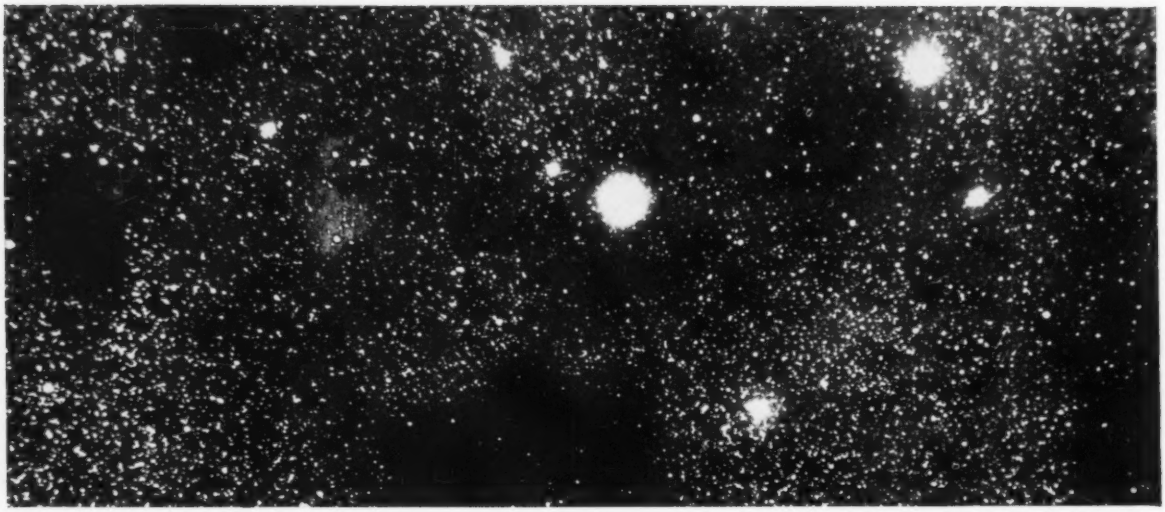

Courtesy Mount Wilson Observatory

FROM BEYOND THE SKY TO BENEATH THE SEAS

In the field of communications, two extraordinary events have occurred within a short span of time. One was the linking of Europe to America by the submarine telephone cable. The other was the sending of radio signals from U. S. satellites in outer space.

Both achievements depended on developments from Bell Telephone Laboratories. The cable was made possible by development of long-life electron tube amplifiers able to withstand crushing pressure on the ocean floor. The satellites derive their radio voices from transistors—products of basic research in semiconductor physics.

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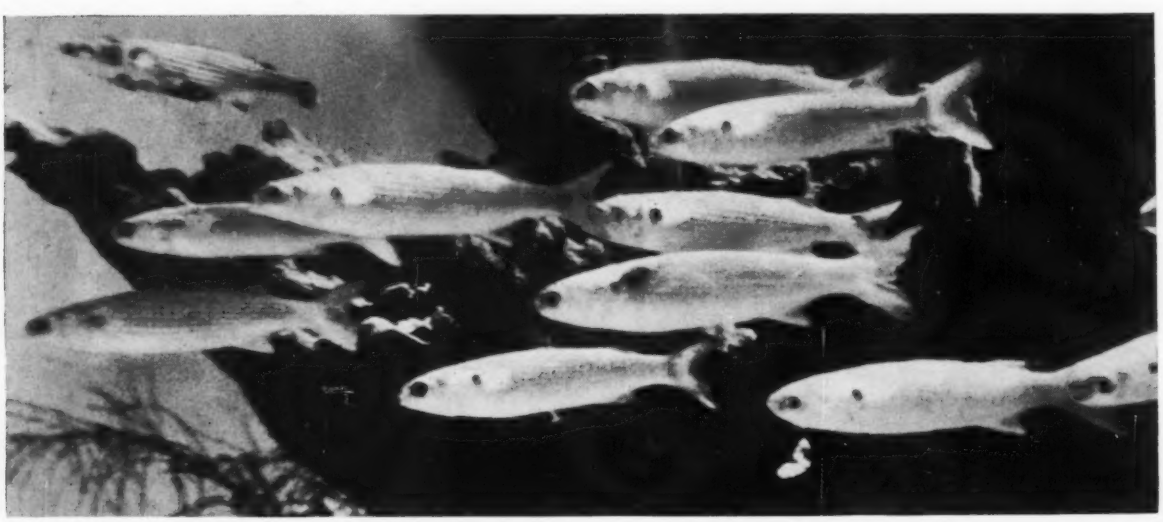

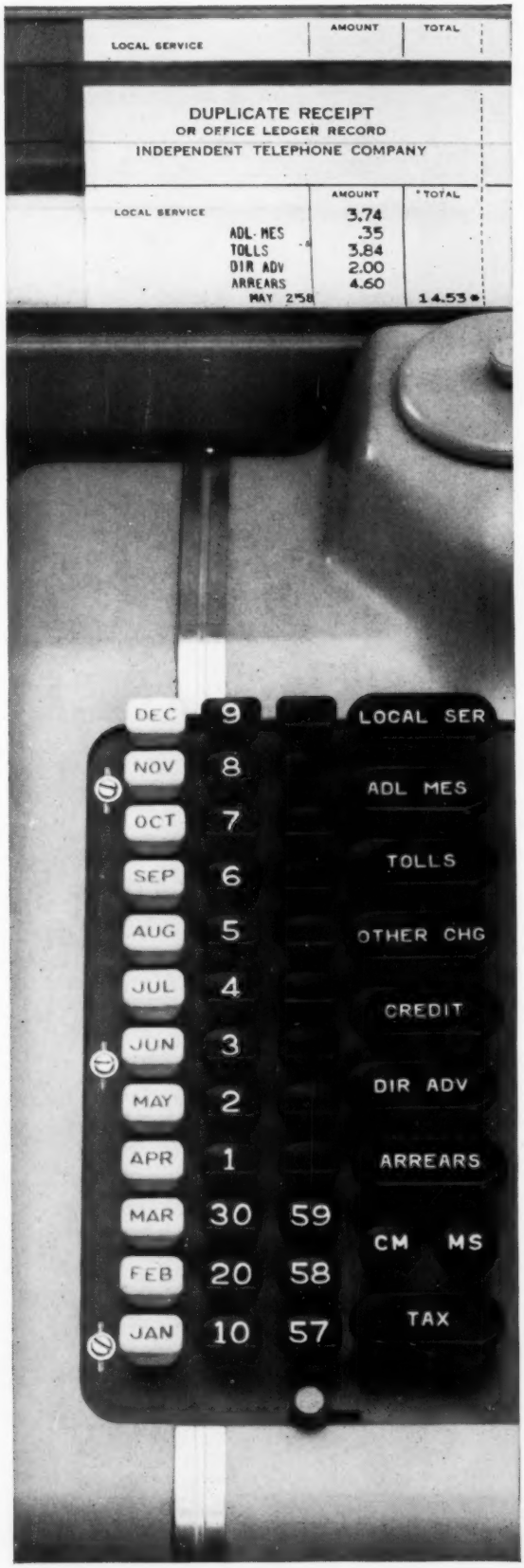

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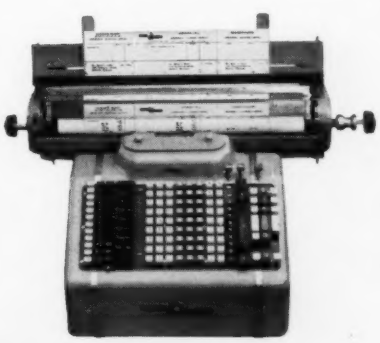

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IN THE NATION'S CAPITAL

BY FRANCIS X. WELCH, WASHINGTON EDITOR

Review of work of Congress, now preparing to adjourn. California Supreme Court upholds state commission in permitting PT&T to file tariffs for private mobile service. Minnesota Supreme Court sustains reimbursements to utilities for relocating facilities along federal-aid highways.

AS THESE lines are written, Congress is in the home stretch. From the standpoint of the telephone industry it has not been a particularly eventful session, despite, or possibly because of, the overriding importance of so many other issues which have engaged congressional attention. International crises and domestic politics, sensational investigations, etc., have not only made the headlines but have also kept many a congressman away from workaday but more prosaic committee sessions which might have considered less sensational measures.

Take, for example, the question of curtailing or eliminating the 10 per cent excise tax on monthly telephone bills and long distance calls. Over a score of bills on this subject have been introduced. But, the Congress failed to do anything about it during the one opportunity which presented itself for floor action. That was during Senate consideration of the recent general tax extension bill when the Douglas amendment to cut down the telephone excises was beaten. The reason for this was not so much the presence of support for, or popularity of, the telephone excise taxes (indeed they are quite unpopular), but rather the overwhelming requirements of the government for as much tax revenue as possible during these critical times.

About the most that the telephone industry can hope for, now, is that progress can be made on legislation which would fix a termination date for the telephone excise taxes. At this writing there was still a technical tax revision measure (the Forand Bill) bouncing around in the Senate. It has already been passed by the House. Efforts were being made to tack on to it a definite termination date for the telephone excise taxes. That may turn out to be the only way to make progress on this stubborn problem of the telephone industry. With Uncle Sam's budget-makers depending more and more on the big take from the telephone taxes, there is a real danger that these so-called "emergency taxes" will become permanently frozen into the nation's tax structure. A termination date, if adopted by Congress, would at least require the congressmen to stand up and be counted on any subsequent proposal to extend the telephone taxes.

In other respects, there cannot be too much complaint about the present session. Efforts to repeal the present small telephone exchange operators' exemption in the wage-hour law have made no progress. On the other hand, not much is expected in the way of correcting labor union abuses, despite the revelations of the McClellan Committee in the Senate. There is a bill to divorce the REA from the financial control of the Agriculture Department, which might have some repercussions on the telephone industry. But, it does not look as if this bill will get through Congress. Or, if it does get through, it will probably be vetoed.

Over in the House of Representatives the Ways and Means Committee has approved a small business tax relief bill. This measure, approved by the Treasury, includes a 20 per cent first year depreciation deduction on certain amounts of new investment, more liberal estate tax treatment, and other benefits. This bill is supposed to carry out a pledge made by administration and congressional leaders to give tax help to small business. But it is doubtful if the bill will get through because of the late start.

The most important provision is the one-year enlarged depreciation allowance. If enacted, the Treasury thinks the bill will cost about 250 million dollars in tax revenues. The provision is designed to encourage small firms to expand their investments. It would allow an immediate tax deduction in the year of purchase for 20 per cent of the cost of certain investments in machinery, equipment and other "tangible personal property." This special depreciation deduction would not cover buildings or other real estate.

In the realm of broader legislation the congressional session now nearing its end is pretty much of a standoff. It has had its moments of disorderly and confusing developments. But it has also accomplished much solid legislation, or will have before the session whistle blows. The trade bill extender, the Pentagon reorganization bill, foreign aid, and defense appropriations will be handled to the satisfaction of a substantial majority.

When we appraise the work of Congress we should not forget the more solid accomplishment, in our concern over the foolish things which it does now and then. For Congress was intended to be a reflection of the *entire* population. And a truly representative Congress would certainly not be composed exclusively of wise and prudent men. As we all know, there are many foolish people as well as wise ones in our general population. They have

votes, too; and sometimes they elect foolish congressmen. So, when we hear about some congressman sounding off in an irresponsible manner, we ought to recall, in a tolerant spirit, the explanation which the old darky once gave about being elected deacon of his church, notwithstanding his known addiction to gin, dice, and other failings. He said, "Dey was a disreputable element in de congregation which riz up an' demanded some representation. Ah is it!"

California Upholds Mobile Filings

It was by the close division of 4 to 3 that the California Supreme Court affirmed a decision of the California Public Utilities Commission in permitting a Bell System company—Pacific Telephone & Telegraph Co.—to file tariffs for private mobile communication service. This is likely to prove an important precedent inasmuch as it is the first move, at the state level, by a telephone company to file tariffs for the regulation of such service as part of its over-all telephone operations.

Another filing which would place mobile telephone service in the category of regulated *interstate* telephone service has been made by the American Telephone & Telegraph Co. on behalf of the Bell System with the Federal Communications Commission. The FCC filing is still pending, however, following objection raised by equipment manufacturers and others.

The California commission took the view, originally, that there was no reason to prevent a telephone company from rendering service via automobile radio-telephone arrangements as a supplemental part of its offering of general telephone service. Of course, the filing of tariffs would subject the service covered by the tariffs to rate regulation and other regulatory jurisdiction of the commission. The commission opinion in Pacific Telephone & Telegraph Co. [(1957) 17 PUR 3rd 200-213] stated on this point:

"The commission finds that competition of regulated companies with the non-regulated, if it is unfair at all, is more likely to be unfair to the regulated rather than to the non-regulated competitors. The record made it clear, and a supplemental filing has given additional assurance, that the applicant will not grant special favors in connection with its regular telephone service to its own mobile telephone customers. In any event, in the commission's opinion, the public has less to fear from the activities of a monopoly when such monopoly is fully regulated by public authorities and we fail to find that Pacific will be in a position to compete unfairly with its smaller rivals."

The California Supreme Court upheld this position. The majority opinion pointed out that the physical nature of the medium used—namely, radio transmission—differed in some respects from both public radio-telephone service and conventional land-line telephone service. The court took this view after considering the private nature of the communication contemplated and the restrictions established under the Federal Communications Act.

Despite these differences, however, the California court majority found that mobile telephone service—such as contemplated by the Pacific Telephone & Telegraph Co., "is a telephone service and, if dedicated to public use, it is subject to the jurisdiction of the commission." The court noted that the California commission had already made a finding that Pacific Telephone & Telegraph Co. had in fact dedicated this service to the public. The majority opinion further observed "the fact that only a restricted portion (of the public) is eligible to apply for it is not determinative. It is offered to all of the public who may be eligible to apply for it."

In this respect the majority opinion would appear to follow the precedent laid down by a long line of earlier regulatory decisions with respect to specialized carriers in the transportation field. In other words, the mere fact that a carrier undertakes to serve only a special class of the public (such as those who ship fruit or moving picture films, etc.) does not diminish the carrier status, itself, as long as any segment of the public wishing to patronize that form of service is eligible to use it.

The opponents to the California filing had urged that this was all part of a maneuver by the telephone industry to avoid the anti-monopoly restrictions imposed on non-regulated operations of Bell System companies by the 1956 Consent Decree which ended the Justice Department's anti-trust suit against the AT&T and its manufacturing subsidiary, Western Electric Co. However, the California commission had this to say on this point:

"While it was frequently asserted at the hearing that Pacific's motive was to avoid the Consent Decree, there was no proof and the commission certainly will not take judicial notice of good or bad intentions. In any event, it is for the federal courts, and not for this commission, to implement their decisions; and the Consent Decree seems specifically to assume that such activities as the one here in contemplation can be rendered by applicant without any injurious effect on the public welfare, so long as such activities are regulated by state commissions. We believe that, if this is the implication of the Consent Decree, it is a fully justified position. If the federal court had wished to bar such activities by the applicant even though subjected to regulation, it would have made such provision and the question would not be before this commission. So far as the effect of the Consent Decree is concerned, it is not actually pertinent to the issues in this case. If the proposed service would be utility service in the absence of that decree, it is still utility service. If we held this service to be utility in nature in the gas company cases before the Consent Decree, there is nothing in the Consent Decree to prompt us to change our holding. If our previous holding that this service is utility in nature, distasteful to Pacific at the time it was made, now turns out because of the Consent Decree to be beneficial to the applicant, that in no wise affects the validity of our previous holding."

What persuasive effect the California court decision may have on pending FCC or other state commission filings by Bell or other telephone companies (covering radio-telephone service) is problematical. The minority view of the California court took the line that the status of a private or unregulated commercial service cannot be changed into the status of a regulated utility service merely by the filing of tariffs covering the same. The minority felt that this should be true even where such service is being rendered by a regulated public utility with respect to its other operations.

Relocation Law Upheld

The position of the Minneapolis Gas Co. has been sustained in a very comprehensive decision of the Minnesota Supreme Court upholding the reimbursement provisions of the 1957 state law permitting utility companies, including telephone companies, of course, to be reimbursed out of federal-aid highway funds for relocation expense. The court ruled that since 1895 Minnesota has been definitely committed to the view that the use of rights-of-way by utilities for locating their facilities is one of the proper and primary purposes for which highways are designed even though their principal use is for travel and the transportation of persons and property.

Furthermore, the court held, considering the fact that the transmission of utility services is one of the general and primary purposes for which highways are designed, it would be unrealistic to construe the broad language of Minnesota Constitution Article 16, Sections 2 and 6, so narrowly as to prohibit the legislature from authorizing the use of highway funds for the nonbetterment location of utility services as a proper cost of highway construction, reconstruction, improvement, and maintenance.

This decision is important because it

(Please turn to page 62)

Telephone Training Courses

By HAROLD B. McKAY

DURING TIMES of unemployment, interest in education often quickens. In industry, as jobs become fewer, employes who have taken training courses are more likely to be retained than those who have not.

The employer may institute training programs in order that those people who are retained will have as wide a knowledge as possible. Employes may take training on their own in order to remain among those who keep their jobs.

Training in the telephone field has always been a difficult feat to accomplish, largely because it is highly specialized. The Bell System conducts its own training program on apparatus used in its own plant. The average Independent telephone company has had a different problem, not only because of the variety of different equipment used, but also because the company is sometimes too small to support a training program.

The telephone equipment manufacturers have each conducted schools on their own type of equipment. These schools are usually conducted at the manufacturer's plant location. The increasing use of electronics in the telephone plant, however, has called for a different type of training. This is because electronics is sort of a universal language for many fields. For example, while a step-by-step and a crossbar telephone exchange represent completely different concepts, the principles involved in electronic switching, carrier, repeaters, radio, television, telemetering, and computers are all part of the same science.

A wide variety of radio and television training courses exist, which are administered by the tube manufacturers and various schools. However, until recently there has been no course generally available which would teach electronics as the telephone man needs to know it.

Cleveland Institute

One company which has entered this field is the Cleveland Institute of Radio Electronics. In its course, emphasis is placed on electronic fundamentals rather than specialized applications. Their line of reasoning is that a technician who is well grounded in electronic principles will be able to meet and understand any electronic device—past, present or future—since the same principles apply to all.

For instance, among the very active electronic fields today are mobile radio, radio and television broadcasting, microwave relays, and the many applications of electronics in railroads, airlines, industry, telephone operations and the home. Switching railroad trains may seem very un-related to cooking Sunday dinner with a radar stove, but the same electronic principles are involved.

According to Cleveland Institute, a great deal of training in the past has been devoted to enabling men to repair certain items of equipment such as television receivers. The weakness there is that the man acquires a specialized skill but very little real knowledge. Thus, he may be a good TV repairman, but be completely baffled by the regulator on a telephone carrier.

A true electronic technician can take almost any circuit in stride.

The program at Cleveland Institute is divided into two courses. The Master Course in Electronics is designed to develop a man to the point where he knows and understands the mental tools of the electronic technician. He acquires, in the process, a diploma and can easily pass the government conducted FCC examinations for first and second-class radio-telephone licenses.

The second course is known as Advanced Engineering. It is actually a college-level course in communication engineering. Math is covered through calculus and theory is covered at the engineering level.

None of the Cleveland Institute courses are for the beginner in communication. Previous training or experience in the field is required. For that reason experimental kits are not necessary and are not employed. Emphasis is on the understanding of theory—fundamentals. It is assumed that the trainee has already become familiar with the physical aspects of electrical or electronic equipment.

Because many phases of electronics are best understood from a mathematical viewpoint, the Master Course teaches the mathematics required. In fact, it starts with a study of addition, subtraction, multiplication and division. After some electrical theory, the student is given lessons in powers, roots and ratios. After this he is brought from fundamental electrical effects through a series of lessons on radio and microwave till he is in a position to pass the FCC test for a second-class license.

A second section of the Master Course carries the mathematical education through algebra, logarithms, geometry and trigonometry. This leads to network calculations and television and broadcast equipment which puts the student in a position to pass the FCC first-class examination. The Cleveland Institute of Radio Electronics has as its president, Carl E. Smith, who is a fellow in both the American Institute of Electrical Engineers and the Institute of Radio Engineers. The lessons are written in a scholarly manner and each contains a study guide series of questions as well as multiple choice tests and subjective and objective examinations.

Cleveland Institute has stressed the importance of an FCC license for many years. Many jobs are closed to anyone not possessing a valid license. Even more important is the value of the license as an indication of technical competence. Since a prospective licensee must take his test in the offices of the FCC with no books or notes to help him, he must have what it takes to be successful.

The FCC examination, like the Master Course, recognizes the importance of electronic fundamentals. Thus, a graduate of Cleveland Institute has a diploma to attest to his formal training program in electronics and an FCC license to prove his technical knowledge.

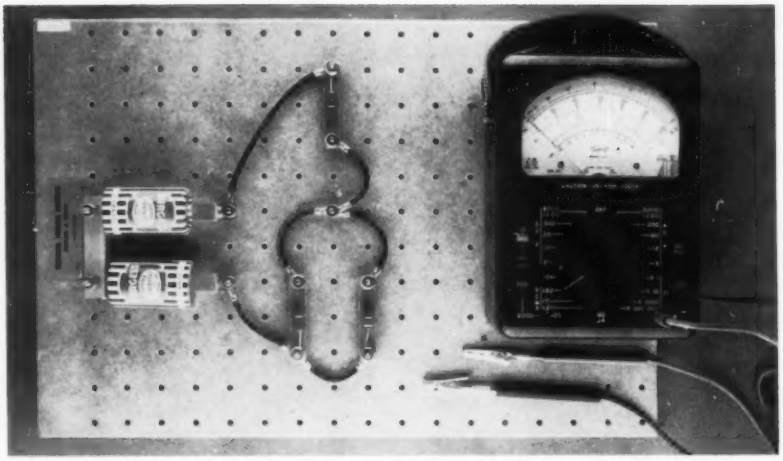
Schools of this sort are not just simply correspondence schools in the old sense of the word. Arrangements are made so that the student has an "instructor," a person to whom he can write to clear up questions which may be puzzling him. In addition, this instructor attempts to evaluate the student's performance so that he may provide extra help where needed. For instance, the student may answer examination questions in a technically correct manner, but yet betray a lack of true understanding to the instructor. The individual treatment afforded by these courses enables a situation like this to be corrected.

Home study courses have one advantage over residence schooling in that no time is lost from work and the student does not have to be transported to and maintained in another city. Also the student can set his own pace and study at the rate that suits him best. Courses of this kind for telephone men might be expected to require about a year of study. Cost will vary with the subjects taken. Typical is the price of $112 for the first section of Cleveland Institute's Master Course.

Telephone Training Institute

Training of a different nature is provided by the Technical Training Institute of Portland, Ore. This school has taught a course in radio, television and electronics for a number of years. In 1954, it investigated telephone training and after considerable preparation and investigation has created a telephone training institute. This is aimed to start with electronic fundamentals and lead into carrier theory and operation.

The problem of the correspondence school in the electronic field has been the number of people who drop out in the early stages, and the problem of teaching basic principles and the trouble encountered by students on the working models they built. The man who is to become a practical electronic technician must know the mechanics as well as the theory of the job. Therefore, the experiments performed must confirm the theory taught and thus assist the student to remember that which he has learned. However, if a student is working without an instructor he may easily make a mistake in wiring up his experiment so that it will not work.



This is a typical electrical problem set up on the Telephone Training Institute peg board. Resistors are mounted on plastic strips and are connected to batteries by jumpers. Meter measures voltage drops.

If he does not yet know enough theory to enable him to shoot the trouble, he may bog down in a hopeless mess. Numerous approaches have been made by different schools to the problem of providing a circuit board or experimental kit.

The Telephone Training Institute uses a pegboard known as the TTI trainer board. This is a sheet of composition board 12 inches by 18 inches, which is perforated with holes one inch apart. Standard banana plugs are placed in the holes in this pegboard so that the threaded-end sticks up where it can receive electronic parts mounted on plastic strips. Each individual resistor, capacitor, transistor, tube socket, etc., is mounted on plastic, the electrical connections terminating in eyelets.

After they are placed on the board, the parts may be wired together with jumper wires equipped with terminals so that soldering is unnecessary. Each experiment to be performed on the board is accompanied by a schematic wiring diagram and a photograph which shows how the parts will look when they are in place. Telephone Training Institute feels that this method is superior to schemes wherein the student merely places parts over a picture or a diagram which is already on the board. It is felt that the TTI method causes the student to think and correlate his thinking with his hands by doing.

According to A. F. Brusch, chief engineer of TTI, a school cannot assume that a student will have the necessary background in fundamentals in order to take a carrier course. Therefore, their course starts with the simplest of experiments, like battery and lamp circuits. Other basic circuits include demonstrations of resistance of wire of different sizes and kinds, a practical circuit which actually demonstrates Ohm's Law on a meter, experiments in magnetism and induction including a special break-apart transformer, which can be dismantled for experimental purposes. More advanced experimental kits include transistor and vacuum tube circuits.

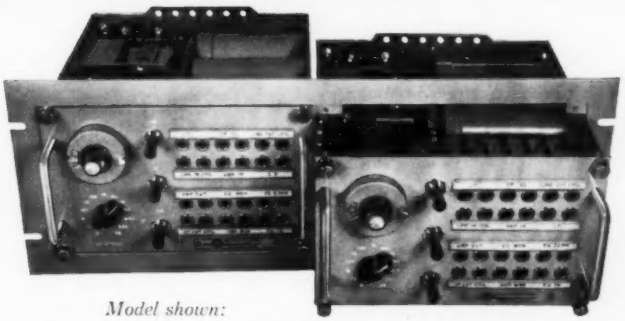
In addition to the experiments provided for in the course, printed lessons are also supplied. These lessons are written in a patient, narrative style, profusely supplied with step-by-step illustrations. One lesson, for instance, in the carrier theory course deals with loss pads and hybrid coils. Eight successive circuit drawings are used to develop the theory of a simple two-resistor loss pad into an attenuator which will match a 600-ohm telephone line. Twelve progressive drawings are used to develop the hybrid coil out of the basic necessity of amplifying in both directions on a single telephone line.

A lesson on transistors, as applied to telephone circuits, includes not only typical operation methods, but also contains instructions on how to read transistor circuit diagrams and instructions on how to solder them without burning them up.

The TTI course includes 56 radio-TV experiments, which contain electronic theory basic to any field of electronics,

(Please turn to page 44)

Airtronics Packaged Program Equalizer reduces line-up manhour costs as much as 75%



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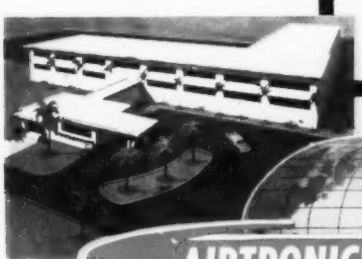

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Public Utilities in the Private Enterprise System

Utilities must recognize need for program to educate public as to their financial needs and operations as regulated businesses and their vital role in our economic system.

by PAUL H. KAUFMAN*

IF I WERE to announce a title for this article I think it would be—"The Place of the Public Utilities in the Free Enterprise System." Each day we hear about our Free Enterprise System, but is it merely a term, or is it something real, is it understood? There are some indications that it is not really understood and appreciated.

I can think of no more pressing need in this country than a wide-spread and thorough understanding of the characteristics of the private enterprise system. We are privileged to enjoy the greatest economic system devised by man at any time in all history—and this statement is made on the basis that our system has done more in meeting the needs and demands of people than any other system to be found anywhere in the world—and certainly, this is a logical basis upon which to judge an economic system.

Accepting this fact, it is the obligation of all of us to do everything possible to keep this system healthy. We in the telephone business must recognize the need for us to be champions of this cause, for we are concerned by some of the attitudes and the lack of understanding toward our business.

A logical place to start in the program to educate the public concerning public utilities and their place in our economic system is a definition of them. The definition itself is relatively simple, but the determination of what is or is not a utility is a bit more complex and court records reveal that over the years courtrooms have been enlivened by the pros and cons over this subject. Essentially, a public utility is a business charged with the public interest—it furnishes an essential service and is without competition in the usual sense of the word—it is a business which, by its very nature, tends to be a monopoly. This status has been given to telephone, electric, gas, water services and common carriers. Less common examples might be bridges, canals and even slaughter houses.

Because of special characteristics public utilities operate in a different atmosphere than other businesses—and that is why the need for a continuous educational program becomes necessary. We need a program which will familiarize the public with the basic differences.

Before pointing out these differences between the operation of a utility and an ordinary business, let us first consider the size of the utility business. It will help us to understand what an important part it plays in our over-all economic life.

It may come as a surprise to some that one-fourth of all the money invested in industry in the United States is to be found in the utilities. More than that, there are four million people employed by the public utilities of the United States. In our own state of Ohio the telephone, gas and electric companies have an investment in excess of three billion dollars. They employ 70,000 men and women and have an annual payroll of more than one-third of a billion dollars.

In the light of investment, the number of people employed, and the essential service involved, one cannot help but realize that public utilities are a most important factor in the workings of our private enterprise system. We in the utilities are proud that, under this system, so different from the systems to be found in most countries, we have made a most outstanding record.

It has often been said, "the proof of the pudding lies in the eating." Reviewing our accomplishments it will be found that although less than 7 per cent of the world's population is in the U.S.A., we have more than 60 per cent of the telephones, produce almost half of the electrical energy, and have more than half of the locomotives in the world. In the United States there is one telephone for every three people—compared with one for every 25 in Europe and one for every 45 in Russia.

Now, let's discuss the differences between the operation of public utilities and other types of businesses. First, is the matter of regulation and then there are certain fundamental economic differences. As to regulation— as I mentioned above, we do not have competition in the usual sense—we are a natural monopoly. So, public utilities differ from other businesses in that they are regulated by government agencies. This regulation is the substitute for competition.

Broadly speaking this regulation covers rates and service and profit. Through a regulatory agency, rates, standards of service, and rate of return (or profit) are fixed. Although a retailer or a manufacturer can raise prices any time he chooses to meet increased costs, a utility cannot raise or lower rates without the consent of the appropriate regulatory agency — and then generally after many months of delay. The utility must serve all in its area in accord with the filed rates. It cannot arbitrarily withdraw from any part of its operation as can an ordinary business, but it must have the consent of the regulatory commission to do so.

Perhaps it should be noted that the principle of regulation is not new—it dates back to the time in Rome when

*Mr. Kaufman is Director of Public Information for the Northern Ohio Telephone Co. of Bellevue, O.

public baths were required to keep open at hours desired by the customers, and to charge rates even the poorest could afford.

Regulation in its modern form came to Ohio in the early 1900's. The regulatory body in our state is the Ohio Public Utilities Commission, a three member board appointed by the Governor. The appointments are for six-year terms. The Public Utilities Commission is a part of the legislative branch of government, not executive. Provision is made which makes it possible for either the public or a utility to appeal to the courts if they are dissatisfied with decisions rendered.

It should be made clear, however, that the telephone industry does not object to the principle of regulation. It appears to be the best plan yet devised to handle the business problems of the so-called natural monopolies. Any business which does not have direct competition, and is furnishing an essential service, should be regulated.

I mentioned certain economic differences between utilities and other types of businesses. Perhaps one of the most serious of these differences is the fact that a telephone company, for instance, has so much more invested per dollar income than an ordinary manufacturing company. For example, one of the largest automotive manufacturers has a plant investment of only 35 cents for every dollar of sales made last year. Our own company, Northern Ohio Telephone Co., has an investment of more than $4.00 for every dollar of revenue. This ratio of property or investment to revenue is a serious problem to a utility, particularly during the period of expansion, such as we have experienced during the postwar period.

Some people think that with an increasing volume of business, it follows that telephone companies have a corresponding period of great prosperity. That is true in case of most businesses, and perhaps some types of utilities, but we in the telephone business know that it does not hold true for our companies.

To meet the many demands made upon us, and to increase our revenue, we must make correspondingly greater investments. For each telephone installed, we are faced with two problems —inflation and interconnection. As far as inflation is concerned, to fulfill the desires of our subscribers we must buy equipment when needed—there is no waiting for lower prices, or more favorable conditions.

The term interconnection refers to the complexities of providing paths to carry conversation between subscribers. It requires more than a pair of wires for each telephone installed—there must be switching equipment which will make it possible for that telephone to be connected to every other telephone in service. The more telephones installed—the more equipment required, so the unit costs of providing service tend to get higher, rather than lower, as telephones are added. The unprecedented demand for telephone service during the past 10 years has necessitated the expenditure of tremendous sums of money. For example, our company spent more in additions and improvements last year than ever before in its history—net additions in the amount of $3,566,-074—and most of this money comes from investors—folks like you and me —who "hire out" their earnings and savings to the company.

Thus, being a regulated business and unable to reprice our service without the consent of a commission, puts us somewhat at a disadvantage in attracting the investors' dollars.

It would seem, then, that regulation and the greater investment per sales dollar (revenue) both of which tend to create a special aspect to financing, are two of the major differences between our business and non-regulated businesses.

But, we also have a problem in the field of public relations—the apparent misunderstanding concerning public utilities. We must somehow make the public understand that certain fundamental business principles apply to all businesses. There are people in every community who apparently think that utilities are rich and can write off any losses which may occur—yet those same people recognize that no other business can stand losses indefinitely, if they are to remain in business.

Perhaps part of this feeling is caused by the word "monopoly"—for that word surely appears to be in ill repute with the public. Many think of a monopoly as some heartless creature interested only in wringing the last drop of blood from both customers and employes. Actually, the word has an entirely different meaning when applied to utilities. Of course, utilities are without competition in only one sense of the word—no other company can provide a similar service to the customer —but they certainly have competition in the labor market, the investment market, and for the consumer's spendable dollars.

Too often it is not understood by the public that not only the investor, but the entire community will lose if a utility fails to make a reasonable return on its investment. It is important to make the public understand that in asking for fair earnings, a utility actually is protecting the user as well as the shareholder. For example, to be deprived of good telephone service is not in the best interest of the public, as a whole. And good telephone service —at reasonable rates—can be furnished only by companies in a sound financial position. In this period of technical advance, good telephone service can be provided only by constantly expanding and modernizing. Naturally, this means attracting new capital and taking the risks which are inherent in expansion and modernization.

There is ample evidence that, over a period of years, lower utility rates prevail where a company has been permitted to maintain a healthy financial condition. Earning a fair return on its investment is to the best interests of both the community it serves and to its employes and stockholders. And, when we mention stockholders we are talking about thousands of people who have either directly or indirectly an investment in utilities.

I do not propose to discuss the term, "fair return." Most of us have our own ideas as to what is a fair return. It can be pointed out, however, that the average earnings of all industrials are far higher than those of utilities.

What I have been trying to point out might be summarized in the following:

There is an urgent need for public utilities to engage in an educational program designed to inform the public that—

(1) A utility must earn enough to remain in a sound financial position so it can successfully compete in the labor and investment market.

(2) A utility must be in an economic position to face a "lag" in securing approval for needed rate increases. This has been referred to as the "regulatory lag."

(3) The profit motive, which has played such an important role in the progress and development of our nation, must apply to utilities so that they continue to improve and expand their facilities to meet the future communications needs of our nation.

When subscribers and the public are informed of these basic fundamentals they will be more understanding of our problems, and will be more sympathetic toward our financial needs —which will strengthen private enterprise in the utility field and this is the only form of operation that can assure our nation the best and most extensive communications service.

THE Plant Man's Notebook

BY RAY BLAIN, TECHNICAL EDITORIAL DIRECTOR

IT HAS BEEN OBSERVED that there is a definite trend by telephone customers to make station-to-station calls in preference to person-to-person calls whenever direct distance dialing (DDD) is available. We believe that this trend is a good one and we have often wondered why operating telephone companies do not take action to promote station-to-station service.

It appears quite reasonable to predict that when DDD service becomes universally available, person-to-person calls will be materially reduced. Perhaps at that time the rate for this type of call will be increased to a point that will cause it to be unattractive to the average subscriber except in special cases.

When in-dialing service is made available to large PBX systems, we believe that station-to-station calls will be increased. It is understood that at the present time, about 75 per cent of all person-to-person calls are to PBX subscribers.

Often, a call is made on a person-to-person basis only to find that the called party is absent after the connection is established and the caller decides to talk to someone else. This type of call is naturally charged at the higher rate and it could and should be made as a number call.

We understand that one large business concern recently made a study of its toll service and determined that on the average they could make two number calls for the cost of one person-to-person call. This is probably due to the fact that when a number call is made and the desired party is not available, the caller will either talk to someone else, or will advise someone what is desired, and leave word for the desired party to call back. This probably averages out, as often two calls are required to complete a transaction on a person-to-person basis.

It is believed that the use of number calls should be encouraged as this is unquestionably the service of the future. Without a doubt it will be this type of service that will cause DDD to pay dividends.

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Recently, we have noted several outdoor type telephone booths in which the glass panels have been broken. This is true of the reinforced as well as plain glass types. It is quite obvious that this has been done by vandals. We have discussed the situation with operating people and have learned that this breakage is excessive in many sections of the country.

Perhaps some relief can be realized by the use of metal instead of glass in the lower panels of the booth. Even this arrangement, however, has some objectionable features. We noticed last year in Germany that the outdoor booths have smaller windows (see cut) than are used in this country. Perhaps such an arrangement reduces the cost of replacement when glass is broken.

In this connection, it would appear that perhaps the most desirable corrective action would be to make use of plastic sheet instead of glass in all outside booths. Plastic glass is used in airplane windows and should prove satisfactory for use in telephone booths.

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Anyone who is interested in modern science should have a little soft covered book of 72 pages that can be purchased from TELEPHONY for $1.25. This little book, "Nuclear Energy" by Dr. Alexander Efron, is a penetrating and compact study of a subject that interests laymen, students, and technical people alike.

In clear, concise language, the atom, its makeup and uses, are completely explained. The general historical background of the electron, the proton, the neutron, natural radioactivity, alpha beta and gamma rays, detectors, and isotopes among other topics are covered in the early portions of the book.

Later discussion centers on more advanced concepts such as the mass-energy relationship, accelerators, induced radioactivity, uses of radioactive isotopes, nuclear fission, research and power reactors, and the hydrogen bomb. Illustrations and questions and problems at ends of chapters contribute to making the text easy to understand.

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Small plastic-insulated and jacketed cables are now being used to advantage in telephone station wiring. This cable is attached to base boards and door and window frames by the use of special drive fasteners. This results in a much neater, as well as faster job, than by using separate pairs of wires in a ring run. This small cable proves especially desirable for the wiring of key type telephone systems.

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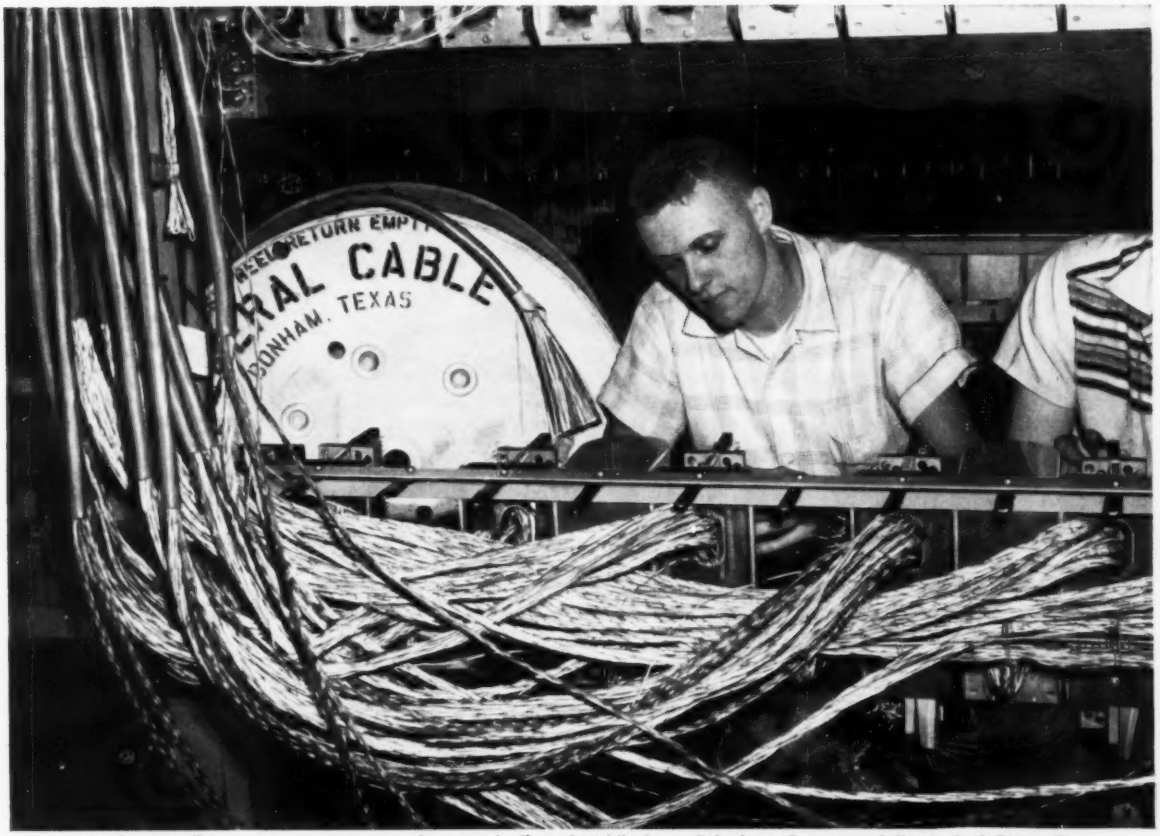
It is claimed that hard work never hurt anybody who happened to be wealthy enough to hire somebody else to do it.

NEW! ...easier, faster switchboard wiring



Cabling to office routiner equipment at the central office of Middle States Telephone Company of Illinois, Park Ridge, Ill.

GENERAL CABLE PLASTIC-INSULATED SWITCHBOARD CABLE

- easy, sure identification: brilliant, sharply contrasting, spirally-extruded and solid colors are part of the plastic... can't wear off.
- fast, easy stripping... and no significant shrink-back when ends are soldered.
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- pliable yet strong; trains easily, keeps its form and smooth, attractive appearance.
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Pioneering Spirit Emphasized

At Oregon-Washington Convention

By Lorraine M. Quinn

ABOUT 550 PERSONS from various parts of the United States, Canada and Alaska took part in the 1958 joint convention of the Oregon and Washington Independent Telephone Associations, held in the Hotel Multnomah in Portland, Oregon, on June 19, 20 and 21. It was the largest telephone convention ever held in the Pacific Northwest.

Lambert Miller, Sunnyside, Ore., president of the Oregon association, presided at the opening session.

One of the main features was an address delivered by Hal Starr, radio news announcer for KGW, Portland. He had been asked to speak on outer space in terms of telephone operations. "I'm not certain," he said, "how we'll go about stringing long lines to the moon, but I do have some fairly concrete observations . . . some applications of outer space to advanced telephony.

"To properly understand and appreciate this business of getting into outer space, I think it wise that we briefly examine the history of rocketry."

He took his guests back to the origin of rocketry which dates back to ancient China. In a document now held in the archives of Princeton University, it is reported that at the dawn of China's history, the country was threatened by Mongolian invaders.

Pivotal point for an invader, the document points out, was the fortress of Kai Fung Fu, and its capture meant certain defeat of the Chinese. The Chinese called upon one of their chief scientists and astronomers, Wang, of the Imperial Court. They asked him to devise a weapon to repulse the enemy. Wang, who had earlier introduced gunpowder into China, now come up with a more powerful weapon which conquered the enemy.

This new and powerful weapon was the forerunner of the rocket.

No more was heard of rocketry, reports Mr. Starr, until 1913 when Professor Robert Hutchings Goddard, then 30 years old, applied for a patent on the first liquid fuel rocket, the basic design of which is used on America's and Russia's missiles today.

Mr. Starr said that in 1935, Goddard fired a "home-made liquid propellant rocket that reached an altitude of more than a mile, and attained the unprecedented speed of 700 miles per hour."

The science of rocketry made no further smashing headlines until 23 years later in October, 1958, when Russia launched Sputnik I, II and III followed by our own satellites, Explorers I and III and Vanguard I.

Much has been learned from these rockets by the use of telemetering equipment, Mr. Starr emphasized. He mentioned that:

"Our scientists foresee the day when a satellite will pass over a city and equipment on the ground will trigger tape recording equipment aboard so

Left photo: At the Pioneer luncheon are (left to right): Mrs. Norman Howerton and Norman Howerton of Ilwaco, Wash.; Mrs. Mayme Workman, TELEPHONY'S traffic editor; J. W. Baker of Spokane, Wash., newly elected secretary-treasurer of the Northwest Chapter of the Independent Telephone Pioneer Association, and Mrs. D. O. Hood of Medford, Ore. Right photo: Discussing the convention are left to right: George Parks, commissioner, Washington Public Service Commission; Maurice Hull, president of the Washington Independent Telephone Association; Clive Haas, USITA president, and Lambert Miller, president of the Oregon Independent Telephone Association.

Delegates attending a banquet at the joint Oregon-Washington convention.

that thousands of messages will be sent by radio to the satellite.

"A minute or two later, that same satellite will be over another city half way across the country. There ground equipment will trigger the playback mechanism, and all those messages will be played back in a matter of seconds and the tape prepared to receive additional messages for later playback over another city.

"With the precise course and schedule of satellites known in advance, a highly complex traffic schedule can be set up with certain sections of the tape reserved for messages between certain cities.

"Another electronic application of satellites is their relay value. A slower-moving satellite further out in space can be used for a long distance relay point. Little power is required for point-to-point transmission and the investment in radio relay equipment will more than offset the maintenance costs of our present-day long lines on the ground.

"As to power consumption, today's solar batteries are becoming more efficient and have a life expectancy in the order of several hundred years."

Mr. Starr stated that the future of long distance communications everyday looks like a simpler problem. He pointed out that its only complicated aspect is our inability to understand how really simple it is.

Mr. Starr also predicted that an early trip to the moon would be made by a five-stage Jupiter-C rocket containing a cosmic ray counter and powered by solar batteries. He added that it should be soon, or as Aeronautical Expert Alexander de Seversky points out, it will otherwise take an American rocket a full 12 hours for the trip. As Mr. Seversky puts it: "One hour for the flight and 11 hours to get through Russian customs."

"We Are Still Pioneering," a talk delivered by Matthew W. Hill, chief justice of the Supreme Court of Washington, pointed out how successfully we have pioneered in communications and transportation when we consider how quickly we can reach other nations. But if we are to live together in peace, he said, then there is much pioneering yet to be done in the field of human relations.

However, Mr. Hill feels that "we won't be too successful in the field of human relationships, with its prejudices, its animosities, its tensions, and its hates—unless we take God into account."

Mr. Hill cited a number of the world's pioneers, among them Abraham Lincoln, who was pioneering a post-Civil War peace based on "malice toward none and charity for all," when his life was cut down by an assassin's bullet. We are still pioneering, concluded Mr. Hill, to drive back the borders of hate, prejudice and intolerance, and to replace them with mutual respect and understanding.

Clive Haas, president of the United States Independent Telephone Association, opened his talk with a reminder that the telephone industry has always had a stabilizing effect on the nation's economy.

He mentioned, as one of the problems of the industry, the fact that: "All of us are operating with more or less debt capital (borrowed money or outstanding bonds). Since there is a real danger of a too-rapid deflation of our money, some of us are worried about paying off inflated dollars with more solid dollars."

The way management is coping with this problem, on the whole, is by keeping cutbacks in planned building or maintenance programs and layoffs in personnel to a minimum, he mentioned.

Toll compensation by Independent companies reached a record high of 186 million dollars in 1957, Mr. Haas continued. "Further studies are being made," he said, "and there is good reason to believe that rising costs of the last few years will soon be reflected in increased toll compensation to all companies."

George Parks, commissioner, Washington Public Service Commission, spoke on "Random Thoughts of a Utility Commissioner."

He mentioned that the Independent industry is now "serving over 9½ million telephone users in some 11,000 communities with a plant investment of about 2 billion 750 million dollars. You are an important and substantial segment of our national business."

Mr. Parks continued: "The telephone industry has played a necessary role in making this country the greatest industrial power in the world with the highest living standard of any nation."

Many people, he mentioned, are not aware that while the telephone business has a monopoly in a particular area, it is still privately owned, and has to pay salaries and buy plant equipment; that it receives no government subsidy, and that it pays taxes like any other business.

He urged publicizing that telephone rates are a bargain at today's prices. He suggested that the telephone companies adopt the policy of the electric companies in citing that telephone service costs only 10, 15 or 20 cents a day.

The more the public knows about the telephone industry, about the work of

commissions, and about what is considered a fair rate of return, the better support you can expect in a justified claim for an increase. Moreover, he continued, you will be less the target of ambitious politicians.

The excuse, he said, that increasingly expensive plant facilities have caused rising rates means little to most people, when other utilities are faced with the same problem. Moreover, if a customer considers his service inadequate, then any request for an increase, no matter how justified, will be considered too much.

Therefore, he urged in rural areas that 10-party lines be reduced to eight or six-party as soon as possible.

A plant open forum was held on June 19 with Douglas Dimmit of General Telephone Co. of the Northwest, presiding. Donald Gibbs, Redwoods Telephone Co., showed slides depicting:

(1) Methods of lashing wires and cables using home-made lasher.
(2) Methods of making small distribution cables and lashing to support wire.
(3) Installing RDW and small plastic cables—terminating and supporting methods.
(4) Another method of closing plastic splices without tapes.

James Kirby of Columbia Utilities Co. spoke on:

(1) Oscillation method of wire sagging.
(2) Sight method.
(3) Dynamometer method.
(4) Use of vibration dampers.

A West Coast Telephone Co. man, Al W. Goodspeed, spoke on his company's use of small vehicles for economy in maintenance and running costs. He illustrated his lecture with slides showing that these vehicles are used for servicemen and installers, and they provide twice as much load space. Mr. Goodspeed discussed uniform spacing of open wire on brackets.

Line construction for high-grade service was considered by Leo McGuire, also of the West Coast Telephone Co.

Mr. Dimmitt, chairman, delivered a talk on transmission and a demonstration on outside plant construction. He discussed standard transmission requirements of loaded and non-loaded cable. He also handled the use of theoretical resistance design.

The second day's session was presided over by Maurice Hull of Forks, president, Washington Independent Telephone Association.

"Matters of General Engineering Interest" were discussed by Charles M. Twelves, chief engineer, Oregon area, Pacific Telephone & Telegraph Co.

Mr. Twelves pointed out how rapidly new developments are occurring in the communications field. There has been great advancement, he stressed, in outside plant construction in both materials and methods. However, the industry could not have met the demands for expansion were it not for microwave, and now he explains, even that medium is becoming crowded.

He continued, "Data transmission as encountered in the SAGE System and customer dialing of long distance calls involves speed of transmission of intelligence much higher than at present, and calls for quality and dependability of plant at much higher levels than ever before attempted."

Mr. Twelves cited the three major components in the Direct Distance Dialing (DDD) system. "They are," he said, "(1) the dial switching system, (2) the message accounting equipment, and (3) the toll circuit network.

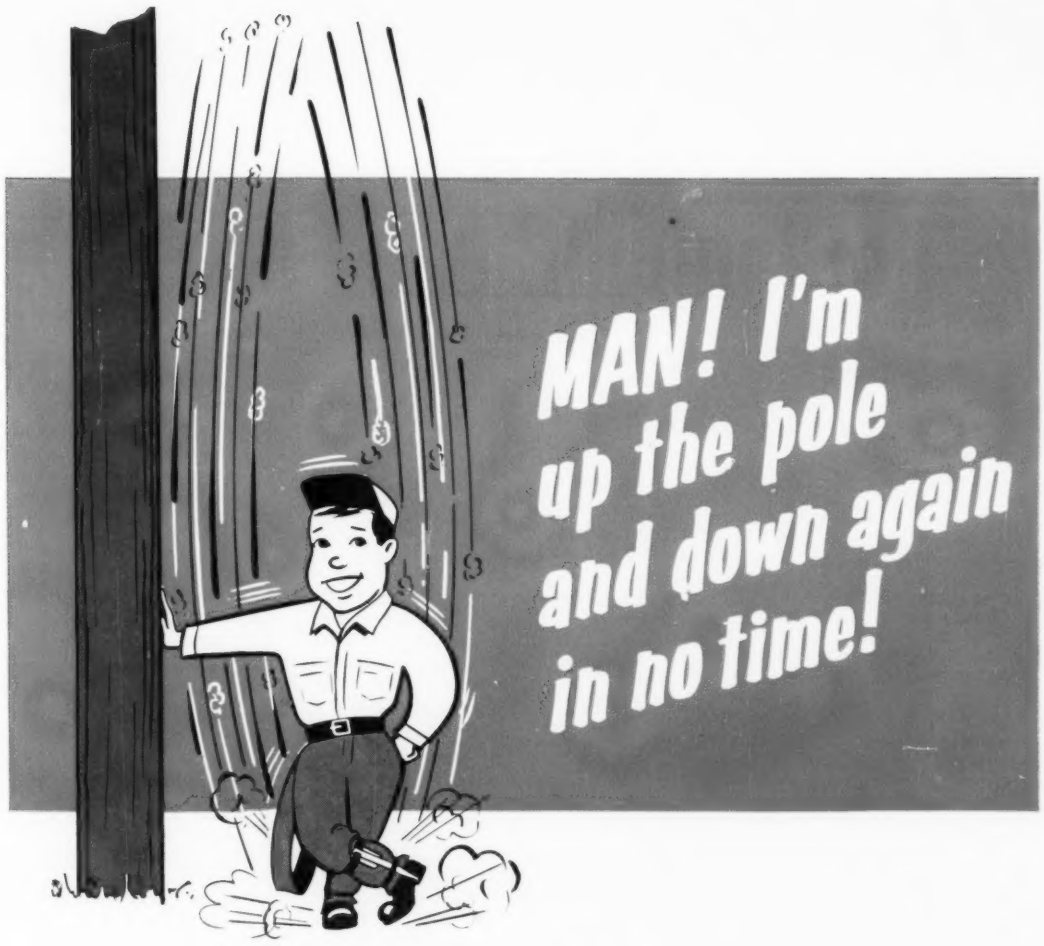
"While the first two involve appreciable outlays of capital, perhaps the biggest problem affecting the expansion of customer dialing is bolstering the toll circuit network to meet requirements imposed by subscribers accustomed to almost no delay on the local switching systems."

Mr. Twelves also mentioned that "toll mechanization must be incorporated in the construction program of future years with proper consideration given to demands for manpower, material and capital."

Mr. Twelves also emphasized "the great importance of improved quality of construction and maintenance to effect the maximum of dependability. New methods, new tools and new training processes must be devised to achieve this objective."

Eighty-five cents of every dollar received for telephone industry operating expense goes to the people providing that service, said L. Gray Beck, vice

Panel members attending the general open forum. Standing, left to right: Al Henry of Hood River, Ore., and Lynn Degerstedt of Vancouver, Wash., who discussed public relations; Derek Brine of Spokane, who spoke on traffic; Ray Fountain of Ellensburg, Wash., and Eugene Bishop of Hood River, Ore., who considered accounting. Seated, from left to right: D. A. Perigo of Beaverton, Ore., who also discussed traffic; James Damon of Mt. Vernon, Ore., moderator; Roy Peterson of Everett, Wash., and Lowell Brown of Silverton, each of whom handled the commercial aspect.



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president and general manager of the West Coast Telephone Co., in his address, "Our Largest Operating Expense—People." Therefore, he said as an industry we have an obligation to obtain the utmost in employe productivity.

According to Mr. Beck five requisites for hiring are:

(1) Determine what the person is like personally.
(2) What he has done.
(3) What he knows.
(4) What he wants to do.
(5) What are his potentialities.

The best test of all for hiring, he feels, is the opinion of a competent and qualified interviewer.

A large employe turnover, he said, often results in:

(1) Higher insurance premiums.
(2) Higher training cost.
(3) The necessity for many more people on the payroll.
(4) Lost production time and consequent delay in meeting scheduled dates.
(5) An increase in the cost of administration and accounting.

He said that in fighting the problem of turnover, employers must remember that empolyes want more than merely a living wage. "They want self respect, the respect of others and the assurance of security."

Mr. Beck continued that adequate supervision is essential but that people need encouragement, help and suggestions for improvement.

He said the current attitude of labor relations is to save and to salvage, not to punish. However, if an action deserves a penalty, he said, four points should be considered:

(1) Investigate carefully both sides of the issue.
(2) Avoid hasty action.
(3) If the offense demands a penalty, make sure that it is adequate but not overdone.
(4) Keep a written account. This is particularly true where a union is involved. The National Labor Relations Board (NLRB) will demand it in case of a showdown between an employe and a union.

Arbitrate where necessary, Mr. Beck encouraged, rather than taking an easy way out and letting an infraction go unpunished where a union is involved.

Having hired the right kind of people and having kept them on the job, the next most important consideration is the supervisor since it will be his function to obtain the most from the employes. When selecting a supervisor, said Mr. Beck, consider: (1) His health; (2) his education and technical knowledge; and (3) his ability to get along with others and to direct them in their specific jobs.

"In an industry growing rapidly and needing dynamic ability, the quality and training of its leaders should not be neglected. To do so is false economy," concluded Mr. Beck.

What decision to make with regard to financial expansion, and whether to take credit or not has been a problem that has plagued many telephone companies, explained J. T. Naylor, vice president of United Utilities, Inc., when speaking on "The Sinews of Credit."

He pointed out that one need only to go back as little as 12 years ago to the immediate growth challenge following the war to realize the financial difficulties that the Independents faced when trying to get credit. Many of the financial institutions were unaware that there were such businesses as Independent telephone companies.

Mr. Naylor noted that: "In our educational process of acquainting banks, insurance companies and investment houses with the resources and the stability of our business we have, during the past 12 years, cultivated many friends. As an industry, we have a 'new look' to many investment sources. Generally speaking, distinction, prestige, and the basic ingredients of reputation have been established by the Independents."

Mr. Naylor also stressed that concealment of financial standing is poor judgment. The more who know the financial story, the better it is for the company when a rate raise is sought. People who know what they are paying for and what they are getting will not object as strenuously to an increase.

There are two extremes that can be followed where credit is involved, Mr. Naylor explained. One is a case in which a company has a phobia against debt of any kind, and the other is over-eagerness to secure money resources by the debt route. The answer to the first problem seems to be to persuade the party of the advantages of a fair proportion of borrowed capital; for the second party the right solution seems to be the refunding of existing loans and the recasting of the loan picture on a healthier basis.

Two basic objectives were cited by Mr. Naylor is setting up the credit program:

(1) Provide a proper balance between fixed obligations (interest on debt and preferred stock dividends,) and discretionary obligations (common stock or the partnership or proprietary account); (2) minimize the net carrying charges on the total capital structure so as to retain a maximum amount in surplus and still meet all fixed obligations and a fair return for the common stockholder or owner.

To prevent financial emergencies, Mr. Naylor suggests that this subject like "the installation of telephones and meeting customer demand, be a day-to-day study, and a matter of foresight, planning and programming." Mr. Naylor explained that the aura of supra-dignity and mystery which is sometimes attributed to the financial profession is not wholly deserved.

"As a commodity, money is no different than the items of the grocery shelf and once the elements of business credit are established along sound lines, the matter of securing capital funds should be approached with confidence and assurance and in deliberate stride," concluded Mr. Naylor.

The Oregon association elected the following directors: M. F. Berglund of De Lake; Lowell Brown of Silverton; Raymond M. Crockett of Redman; Lyle Cross of Beaverton; Rodney Cummings of Philomath; Floyd Day of Estacada, and Earl Dean of Hood River.

Also elected were John H. Dillard of Nehalem; Don Gibbs of Cave Junction; William Graeper of Aurora; Dellman O. Hood of Medford; Ernest R. Hood of Portland; Lambert Miller of Sunnyside and Leon L. Roome of Halsey.

The association elected the following officers: L. E. Scott of Lebanon, president; James W. Damon of Mt. Vernon, vice president and Leslie A. Gritten of Everett, Wash., secretary-treasurer.

Trustees elected by the Washington association are: A. J. Barran of Spokane; W. F. Barnett of Vashon; L. Gray Beck of Everett; Lee Bolles of McCleary; L. M. Curry of Yelm; Earl Dean of Hood River, Oregon; B. L.

(Please turn to page 44)

Northwest Pioneers Elect Officers

The Northwest Chapter of the Independent Telephone Pioneer Association held its annual election at a meeting on June 19. The following officers were elected:

President, Norman S. Howerton of Ilwaco, Wash.; vice president, Ernest R. Hood of Portland, Ore., and secretary-treasurer, J. W. Baker of Spokane, Wash.

Comprising the executive committee are: Harley Barber, John Dillard, W. C. Mumaw, Earl J. Thierer and H. E. Wright.

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TELEPHONY'S Traffic Engineering Handbook

By Gilbert R. Brackett

August 2, 1958

Section 21 (Continued)

Managing Your Office—Manual

The character of telephone service hinges, in a large measure, on adequate maintenance of all central office equipment. Close coordination between traffic and plant departments is a must, if an office is to be maintained properly. The man in charge of the office should make frequent personal checks, in addition to checks provided in trouble routines. He should be sure that the practices are working effectively, that troubles are reported and cleared promptly, and that cooperation between plant and traffic forces are kept at a high level. The plant department should be notified promptly of any unusual or unexplained increase in a certain kind of service difficulty, in order to get its assistance in determining whether there is any maintenance or equipment reasons for the condition.

Unoccupied switchboard positions, which may be used under increased load conditions, should be maintained at the same level as the regular positions. Peg count registers should be tested for accuracy before each peg count. Night alarm, fire alarm and emergency lighting equipment should be tested daily.

The good maintenance of operator chairs is important. Comfortable seating adds to the comfort and efficiency of the operating forces.

Good maintenance involves not only the correction but the prevention of trouble, by tests and inspections, and by proper use of the equipment by operating forces. The person in charge of the office should closely scrutinize careless practices which could adversely affect the equipment, a few of which are:

(1) Pulling cords when disconnecting.
(2) Turning down out-of-order cords.
(3) Dropping plugs.
(4) Placing heavy articles on the keyshelf.
(5) Improper handling and wrapping of headsets.
(6) Tying knots in headset cords.
(7) Dropping headsets.
(8) Handling pencils carelessly so as to break off points in jacks.
(9) Unnecessary handling of keys.
(10) Unscrewing key tops.
(11) Marking, scratching or defacing equipment and bulletins.

The person in charge of the office should be responsible for seeing that suitable emergency facilities are provided, properly designated and in good working order. He should make certain that the action taken for maintaining or restoring service, when an emergency occurs, is thoroughly understood by all traffic supervisory employees and others who may be required to use the equipment and for coordinating all emergency practices with the plant and commercial departments.

In addition to the practices for caring for the more common emergencies, definite instructions should be coordinated with the plant and commercial departments for the procedures to follow when a public disaster, or other extreme emergencies, arise that could affect the telephone service of a large number of subscribers. These instructions should include an emergency list of plant and traffic department officials and employes to be called and a list of subscribers, such as police and fire departments, hospitals, public utilities, etc., who should be given preferential service.

Section 22

Numbering Arrangements

This section will be devoted to familiarizing the traffic engineer with the broad aspects of the numbering plan problem and why it is an important phase of the traffic engineer's job.

By numbering arrangements, or numbering plans, is meant the system of identifying each telephone or station in a community, or calling area, by a distinctive designation which can be used in calling that particular telephone. Such a designation, or number, usually appears in the directory and generally on the number plate of the telephone instrument. It also represents a specific location on the switching equipment through which the connection is established to the desired telephone. Briefly, it is the telephone address of the station.

Numbering arrangements have an important impact on the grade of service given, especially where local and toll dial operation works together. The customer will receive, when he dials the call himself, the best service which the facilities are capable of providing, as he dials the number with ease and convenience and without error. Dialing errors leads to misrouted calls and annoy not only the calling party but the called party as well. They also can lead to billing errors. A numbering system which is not clearly understood by the customers results in unduly large percentages of calls being routed to the assistance operators with resulting delay in completion.

(Section 22 will be continued next week)

Courts and Commissions

Ask FCC to Investigate Mobile Radio Field

A petition was filed with the Federal Communications Commission on July 24 by Motorola Inc., two public mobile radio service operators, and three mobile radio maintenance organizations, asking for an investigation into the operation and regulation of public land mobile radio stations and services.

The petition questions whether major landline telephone companies should be permitted to engage in mobile radio service, and if so, how they should be regulated in the public interest.

The public mobile radio service operators signing the petition are Chicago Communications Service, Inc. and General Communications Service of Tucson, Ariz. The mobile radio maintenance organizations joining in the petition are Electronic Communications Service, Inc. of Milwaukee, Wis.; Goodenough's, a Janesville, Wis., partnership, and Earl Clausen of Milltown, Wis.

Mobile radio is one of the fastest growing users of the radio spectrum, the petition points out. Over one million units are now in service. The use of these units is divided into two categories by FCC rules: (1) public mobile and, (2) private mobile.

There are currently two classes of public mobile radio operators:

(1) Large telephone common carriers, particularly the Bell System companies.

(2) Independent or miscellaneous common carriers, of which there are more than 300 scattered throughout the country.

The independent or miscellaneous common carriers were authorized by the FCC to provide competition for the telephone companies in the public mobile radio field, yet the petition asks whether these and other independent organizations can survive under present FCC rules and how healthy regulated competition can be fostered.

For example, the independent common carrier cannot interconnect with the landline telephone exchanges whereas the telephone mobile radio common carrier does interconnect. The petition, among other matters, questions this distinction.

In another, but related proceeding, the Bell System companies have asked the FCC to greatly enlarge the radio spectrum allocated to them for public mobile radio. The petition points out that the undisciplined extended use of radio frequencies by the telephone companies could result in an invasion of *private* mobile radio under the guise of *public* mobile radio service.

This, the petition said, would threaten the existence of hundreds of local independent radio maintenance organizations and independent common carriers as well as independent manufacturers. The petition also points out that the same result is threatened by the Bell System proposal to make Bell System companies eligible for whatever licenses are available in the various private mobile radio services.

The petition contends that investigation by the FCC would disclose the need for remedial action. This investigation, according to the petition, should lead the FCC to:

(1) Diversify ownership of public common-carrier mobile radio systems.

(2) Stop the combining of ownership, management, and operation of mobile radio services with wire telephone exchanges affiliated with equipment manufacturing organizations. Such a combination, according to the petition, is highly prejudicial to all affected mobile radio industry interests. This includes manufacturing, distribution, maintenance, public service, and public administration.

(3) Impose limitations as to service area, class of service and allocation of frequency channels if wireline exchange telephone companies are permitted to own and operate common carrier mobile radio systems.

(4) Give all independent mobile radio common carriers equal rights to interconnect with the landline telephone exchanges.

(5) Define division of service responsibilities between public common carriers and private mobile radio systems.

Ask Financing OK In Ark.

The Arkansas Telephone Co., Inc., Clinton, on July 19 asked the Arkansas Public Service Commission for permission to borrow $100,000, due Sept. 1, 1978, from the Banker's National Life Insurance Co., Montclair, N. J. The company also asked permission to issue 200 shares of cumulative preferred stock at $50 per share.

Alabama Supreme Court Upholds Fair Value

In a decision announced on July 24, the Alabama Supreme Court upheld Southern Bell Telephone & Telegraph Co.'s position regarding the basis on which telephone rates in the state should be fixed. The action resulted from an appeal by the Alabama Public Service Commission of a 1955 decision of the Montgomery County Circuit Court which approved a rate increase of approximately 5 million dollars.

The supreme court said that before an accurate determination can be made as to whether rates currently being collected under bond are reasonable or proper, a new appraisal of what constitutes the "reasonable value" of the company's Alabama properties must be made. The court continued:

"Unquestionably the legislative intent was that consideration and good faith be given to the element of reproduction costs of a utility's property for rate making purposes.

"It seems apparent that the commission did not consider this element to have any weight in its determination of the reasonable value of the company's property.

"In fact, there was a rejection of this element, the commission stating in its order that it was of the opinion that the proper rate base is net average investment less depreciation.

"While the cost of reproduction less depreciation is not, as contended by the company, the sole criterion, it is nevertheless one of the elements which the legislature has said shall be considered in determining the reasonable value of a utility's property for rate-making purposes.

"In excluding the cost of reproduction as one of the essential factors in arriving at the rate base, the commission erred to the prejudice of the company's substantial rights in its application of the law."

In its decision, the supreme court

remanded Southern Bell's rate case application to the commission with instructions to find the reasonable value of the company's properties, giving consideration to reproduction costs and to take fair return testimony applicable to such rate base.

In the meantime, present rates will remain in effect under bond.

The supreme court ruling was written by Associate Justice John L. Goodwyn and the rest of the court concurred in his findings.

A chronology of the events leading to the July 24 decision follows:

Jan. 20, 1954—Company files petition requesting $4,790,200 in additional annual gross revenues with the Alabama Public Service Commission.

February & March, 1954—Hearings of case before the commission.

Apr. 21, 1954—Commission denies application in full.

May 24, 1954—Company appeals to Montgomery County Circuit Court.

June 18, 1954—Court grants company's petition under bond.

Dec. 7, 1954—Commission orders company to show cause why rates should not be lowered.

Dec. 17, 1954—Circuit Court restrains show cause order.

Nov. 16, 1955—Circuit Court sustains company's appeal.

Nov. 29, 1955—Commission appeals to state supreme court.

Jan. 24, 1957—State supreme court hears arguments made on behalf of company and commission.

July 24, 1958—Supreme court remands case to commission to find fair value.

Deny Rate Raise Request By La. Independent

The Louisiana Public Service Commission on June 3 denied the application for a rate increase of the Breaux Bridge Telephone Co., Inc. (TELEPHONY, Feb. 22).

The company had requested the raise saying that its income was not sufficient for it to pay the principal and interest on a $553,628 REA loan.

It presented evidence to the commission showing that its net operating income was $12,396.89, which the commission stated was sufficient to pay the interest on the company's mortgage and provide a return of over 4 per cent on the equity amounting to $59,757. The interest on long-term debt was shown as $9,989, leaving $2,407.89 for the equity holders.

The commission said: "The capitalization of the company consists of long-term debt in the amount of $553,628 and stockholder's equity amounting to $59,756.99. This results in a debt ratio of 90.26 per cent which is about normal for an Independent telephone company that has been financed by loans from the Rural Electrification Administration."

The commission staff made several adjustments to operating revenues and expenses which resulted in an adjusted amount of net operating revenue of $14,791.45. The commission also felt that the company had selected an abnormal year (1957) as a test period in this case during which the plant maintenance costs of $23,062.53 were exceptionally high due to the damages inflicted by Hurricane Audrey.

Also, the commission said that a charge of $30,673.85 for executive and office salaries amounted to about $10,000 more than the year immediately preceding the test year.

It felt that the executive and office salary accounts were extremely high for a company of this size (1,700 subscribers) and should be adjusted to an amount that was commensurate with the scope of the company's operations.

Therefore, the commission said the rate raise was denied because after adjusting for the salary factor alone, the resulting net operating revenues would have amounted to $26,653.53 and after providing $10,000 for interest on debt, the balance of $16,653.53 is nearly 28 per cent of the total equity investment amounting to $59,757.

Seven Seek Sale Approvals, One Asks Stock OK In Ind.

The Smithville Telephone Co. recently filed an application with the Indiana Public Service Commission to buy the Greene County Telephone Corp., Lyons, the Griffin Telephone Corp., Hymera Telephone Co., Lizton Telephone Co., Goldsmith Co-op Telephone Co., and the Sharpsville Telephone Co.

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Also in Indiana the Northwestern Indiana Telephone Co., Hebron, on July 3 asked the commission for permission to purchase the Mount Ayr Telephone Co.

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On July 9, the General Telephone Co. of Indiana, asked the commission for approval of the sale of 60,000 shares of $2.50 preferred stock.

General of NW Markets Bonds

General Telephone Co. of the Northwest, Spokane, Wash., has sold 2 million dollars worth of first mortgage 4½ per cent bonds due 1988, to three financial institutions. Equitable Life Assurance Society of the United States took one million dollars worth, California State Teachers' Retirement System, $900,000, and Wilmington Savings Fund, $100,000.

Accuse N. Y. Telephone Man of Spoiling Police "Tap"

The case of James A. Warren, co-owner of the Coxsackie (N. Y.) Telephone Co., who is accused of letting a subscriber know that his telephone was to be tapped, was ordered presented to a Catskill, N. Y. grand jury on July 22 after a hearing before County Judge Roy Moon.

At the time of his arrest on July 8, Mr. Warren said he had called the subscriber while two state police officers were in his office because "It is high time somebody had the courage to stand up against such an invasion of privacy."

The troopers had brought to Mr. Warren's office an order signed by a judge, permitting them to install the tap on the telephone of a subscriber who was involved in a gambling investigation.

At the July 22 hearing, District Attorney Alex Wiltse said the two state policemen testified that Mr. Warren was not primarly concerned with the invasion of privacy. Mr. Wiltse quoted the officer's testimony as saying that Mr. Warren was upset and refused to cooperate because the last time the state police installed a tap on one of the company's telephones, the police allegedly damaged some of the company's equipment.

Mr. Warren was released without bail pending the grand jury which will meet in October.

OK Two Sales, Stock Issue In Mo.; Two Seek to Buy

The United Telephone Co. of Missouri, Kansas City, has sold its Pilot Grove, Bunceton and Nelson exchanges to the Mid-Missouri Telephone Co. of which Harold Jones of Gilliam is the owner.

The United Telephone Co. had owned the exchange since July 1, 1928, when it was purchased from Henry Eccles of Eldon.

The Missouri Public Service Commission on July 14 granted the United of Missouri permission to sell its Gerald exchange, serving 517 subscribers, to the newly formed Bourbeuse Telephone Co., Sullivan (TELEPHONY, May 17).

The commission also granted the Bourbeuse company the right to issue 1,000 shares of no-par common stock and 1,000 shares of non-voting cumulative preferred stock with $100-a-share par value (TELEPHONY, May 10).

Application was filed with the commission on July 15 by the Grand River Mutual Telephone Corp., Princeton, which seeks to purchase the Worth

(Please turn to page 38)

New Type 85

PROVIDE TWO-LINE PICKUP,

EXTENSION EXCLUSION
Pressing first button cuts off all extensions on Line 1. Pressing second button brings extensions back on the line (extensions are automatically restored when handset is replaced).
TYPE 85-C
TWO-LINE PICKUP
Turning this button connects telephone to a second line. By pressing this button, user can signal his secretary with a light or buzzer.
OPERATOR

Telephones

SIGNALING AND EXTENSION EXCLUSION

Here's a wonderful convenience for small commercial subscribers. We call it the Type 85-C Telephone (shown at left).

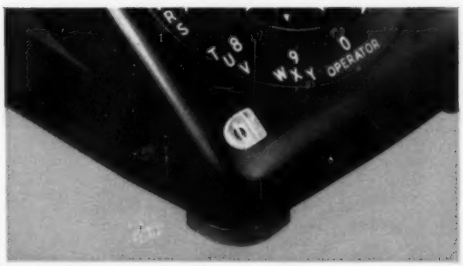
With this instrument, your subscriber has access to two outside lines. He can exclude all extensions. He can signal his secretary. He can do all these things with the versatile Type 85-C telephone—at the flick of a button.

The Type 85-C telephone fills a special need for many subscribers in your area. Doctors, attorneys, insurance offices, real estate agencies (and you'll think of many more) are all potential customers. They'll want the convenience, efficiency and privacy that the Type 85-C provides.

Subscribers will like the classic beauty of Type 85-C. It's identical with our famed Type 80. Has all the regular Type 80 features, too—including 10 attractive colors.

We'll be happy to tell you more about the versatile Type 85-C Telephone. Just write: *Automatic Electric Sales Corporation, Northlake, Ill. Or call Fillmore 5-7111.*

OTHER MODELS OF THE TYPE 85 TELEPHONE



TYPE 85-A. Has combined push-and-turn button only, for 2-line pickup and signaling. Can be wired, on the job, for these other arrangements: single-line ringer cut-off, single-line extension switching, single-line extension switching with ringer transfer, external ringer control, and extension exclusion with line shorting.

TYPE 85-B. Has pushbuttons only, for extension exclusion. Can be wired, on the job, for 2-line pickup.

AUTOMATIC ELECTRIC

Subsidiary of **GENERAL TELEPHONE**

Mutual Telephone Co., Gentry, with exchanges in Lone Star, Gentry, Ravenswood, Denver, Parnell, Darlington, Alanthus and Worth. Application to intervene was filed by the Inter County Telephone Co., Gallatin, on July 15.

Application was also filed with the commission by the Chariton Valley Telephone Corp., Bucklin, for authority to purchase the Bosworth Telephone Exchange, presently the property of Mac and Nellie Wilhelm.

OK Loan, Service Change; Set Two Hearings in Neb.

The Nebraska Railway Commission on July 22 authorized the Capitol Telephone Co., Cortland, to apply for an REA loan of $516,000. This will be used to purchase and rehabilitate the Cortland Telephone Co., Hickman Telephone Co., Martell Telephone Co. and the Firth Telephone Co. (TELEPHONY, July 12.) Dial service will be installed. The commission also approved the discontinuance of extended area service between Cortland and Hallam and Martell and Hallam.

The commission also set two hearings July 25. The South Star Telephone Co., O'Neill, is asking permission to connect lines formerly owned by the Dorsey Telephone Co., O'Neill, with lines running directly into O'Neill.

Chrisp's Telephone Co., Paxton, is seeking authority to acquire the properties of the Paxton telephone exchange and the Madrid-Elsie telephone exchange of Paxton. Elmer J. and Era R. Chrisp filed articles of incorporation on July 18 for the Chrisp's Telephone Co. with authorized capitalization listed at $100,000.

Cut B. C. Company Rate Raise By One-Third

The British Columbia Telephone Co. was awarded a general rate increase recently amounting to about one-third of what it had requested, by the Canadian Board of Transport Commissioners.

The board authorized the company —effective Aug. 1—to raise rates a total of 1.3 million dollars a year.

The company had asked for raises amounting to $3,996,000 a year.

The long-distance increases apply to calls within British Columbia and between British Columbia and Alberta. There are no increases on calls touching other provinces.

The company had sought increases that would have yielded $3,275,000 from local rates and $721,000 from long-distance service.

Instead, the authorization allows it an increase of $580,000 locally, and $720,000 long-distance.

Sample one-party business rate raises include: $13.25 to $13.70 in Vancouver, and $9.50 to $10 in Victoria.

Breezewood (Pa.) Company Requests Rate Increase

The Breezewood Telephone Co. on July 3 requested a $13,800 annual rate increase from the Pennsylvania Public Utilities Commission for its 791 subscribers.

The company said it needed the additional revenue to pay maintenance and carrying charges on a $475,000 project in which it has just converted its three exchanges to automatic operation. It said it will not earn a fair return with the higher rates but "hopes for some stimulation of business to permit paying interest and preferred stock dividends, and to amortize funded debt."

General of SE Asks Raise For 10 W. Va. Exchanges

The West Virginia Public Service Commission has set a Sept. 10 hearing date on an application by General Telephone Co. of the Southeast to charge higher rates to 21,304 subscribers receiving one-party residence and business service.

The company said the new rates would bring in an additional $299,322 a year, needed because of "depressed earnings."

The following exchanges would be affected: Bluefield, Princeton, Welch, Northfork, Bramwell, Kimball, Keystone, Athens, Matoaka, and Davy.

Present and proposed rates for Bluefield are as follows:

	Old	*New*
One-party residence ...	$ 5.00	$ 5.75
One-party business	$10.00	$13.00

Rates will vary from community to community. Examples of rates being sought outside of Bluefield are, for one-party residence service: Princeton, $4.50 (present), $5.25 (proposed); Welch, $4.25 (present), $4.75 (proposed; Bramwell, $3.25 (present), $4.25 (proposed); and Kimball $3.25 (present), $4.00 (proposed).

Transfer of Service Asked By Illinois Group

The Illinois Commerce Commission on July 3 took under advisement the petition of 190 residents of Chapin for the General Telephone Co. of Illinois to take over the services of the Farmers' Telephone Co., Chapin.

Richard Wilson, a director of the Farmers' company, said that most of the company's 208 subscribers are dissatisfied with present service and 50 families are unable to get telephone service because of inadequate facilities.

Five Telephone Loans Authorized By REA

THE Rural Electrification Administration has approved the following telephone loans:

Cream Valley Telephone Co., Hawkins, Wis.; $330,000; July 8.

With these loan funds, the borrower proposes to acquire, rehabilitate, and integrate the facilities of the Gilman & Western Telephone Co., Gilman. The Gilman company is presently furnishing dial service to 482 rural subscribers through central offices at Gilman and Hannibal.

The Gilman central office facilities will be retained in the expanded system; the Hannibal exchange will be divided into two exchange areas, one to be served through the present Hannibal automatic office, and the other through a new automatic central office to be constructed at Jump River. Improvements and new construction in the area will mean improved service for the existing subscribers and initial service for 167 rural families.

REA loans to the Cream Valley company total $741,000 which will benefit 1,419 rural subscribers. The system will consist of six exchanges of which Hawkins and Kennan are providing dial service to about 470 rural subscribers.

Robert N. Price is president and William Steventon is manager of the Cream Valley Telephone Co.

•

Prattsburg (N. Y.) Telephone Co., $352,000; July 11.

These funds will be used by the borrower to improve service for 582 rural subscribers, and to furnish initial service for 187 families. The subscribers who will get improved service are now receiving magneto service from the East Pembroke Telephone Co. The borrower plans to acquire, rehabilitate, and integrate these facilities.

A new automatic central office at East Pembroke is among new facilities planned for construction by the borrower. REA loans to this borrower total $1,075,000 which will enable it to provide new and improved service to

2,702 subscribers through six automatic exchanges.

Herman H. Wagner is president and manager of the Prattsburg Telephone Co.

•

Northeastern Telephone Corp., London, Ky.; $2,341,000; July 15.

These funds will enable the borrower to improve service for 446 rural subscribers, and to furnish initial service to 3,240 families in an expanded area. At present the existing subscribers are receiving automatic, common battery, and magneto service from the Pulaski County Telephone Co., Science Hill; and the Rockcastle Telephone Co., Mt. Vernon. The borrower plans to acquire, rehabilitate, and integrate these facilities.

New construction scheduled includes seven automatic central offices at Bent, Eubank, Faubush, Science Hill, Brodhead, Livingston, and Mt. Vernon. The Science Hill and Mt. Vernon buildings will also include commercial office facilities.

A portion of this loan will be used to finance construction of a garage and warehouse building in London, principal headquarters of the system. Microwave toll facilities will also be installed in the London exchange to handle some of the toll calls in expanded rural areas of the system.

REA loans to this borrower now total $6,084,000 which will enable it to furnish new and improved service to 11,528 subscribers. The system will consist of 18 exchange areas. Ten of the exchanges are now providing dial service to approximately 5,670 subscribers.

LeRoy T. Carlson is president of the Northeastern Telephone Corp. and Perry D. Woodward is the manager.

•

Delcambre (La.) Telephone Co.; $27,000; July 16.

These and funds from a prior loan will be used by the borrower to install facilities which will enable it to provide two-way dial mobile telephone service to 18 additional subscribers. This borrower had received two loans amounting to a total of $163,000. With these funds it will be able to provide new and improved service to 541 rural subscribers. Approximately 390 rural families are now receiving dial service.

Lane J. LeBlanc is both president and manager of the Delcambre Telephone Co.

•

Homerville (Ga.) Telephone Co.; $94,000; July 17.

These funds will be used by the bor-

drops last

and last

and last . . .

AND COSTS LESS TOO

WITH ALPHADUCT
NEOPRENE JACKETED
DROP WIRE

You'll be money ahead when you use long lasting Alphaduct drop wire. The tough neoprene jacket is the most effective weather protection ever developed. Alphaduct is scientifically made on modern machinery, is step tested during every stage of manufacture. You can depend on it to cut down on maintenance trips.

Alphaduct's Dumbbell or figure eight construction saves on first costs too. It is less expensive than twisted pair, yet has proved to be every bit as satisfactory. Actually, Alphaduct Dumbbell drop wire has the same thickness of insulation and neoprene jacket per conductor as is used on regular twisted pair. The figure eight construction makes it much easier to split than regular parallel.

Try Alphaduct neoprene jacketed Dumbbell drop wire. It's dated . . . so you can easily check the extra service it will provide. Order today from one of our distributors listed below.

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REGIONAL DISTRIBUTORS—THE LINDSAY TELEPHONE SUPPLY CO., CLEVELAND, OHIO
PANKEY SUPPLY COMPANY, CHARLOTTESVILLE, VA.

rower to provide facilities to serve 77 rural families in its present operating area. Funds are also included to complete the system as authorized in the prior loan. The two loans which total $475,000, will make it possible for the Homerville company to provide new and improved service to 869 subscribers. At present the company is furnishing dial service to about 670 subscribers through its Fargo and Homerville automatic exchanges.

Downing Musgrove is both president and manager of the Homerville Telephone Co.

REA Reaches 170,462 Rural Subscribers During Year

Loans approved by the Rural Electrification Administration during the fiscal year that ended June 30 will provide new or improved telephone service to 170,462 rural subscribers, the U. S. Department of Agriculture announced on July 18.

Telephone loans reached a new high of 89.2 million dollars. A total of 216 loans went to 204 rural telephone systems in 39 states and Alaska, including loans to 66 new borrowers. The program now has 608 active borrowers.

The following table gives the number and amount of fiscal year 1958 REA telephone loans by states:

	No. of Loans	Amount*
U. S.	216	$89,238,000
Ala.	7	1,497,000
Ariz.	—	—
Ark.	—	—
Cal.	2	6,581,000
Colo.	2	442,000
Conn.	—	—
Del.	—	—
Fla.	3	1,982,000
Ga.	13	3,724,000
Ida.	2	211,000
Ill.	10	3,456,000
Ind.	4	2,522,000
Ia.	11	4,001,000
Kan.	12	3,945,000
Ky.	6	4,738,000
La.	6	832,000
Me.	4	742,000
Md.	—	—
Mass.	1	18,000
Mich.	4	1,754,000
Minn.	11	3,234,000
Miss.	3	1,031,000
Mo.	14	7,211,000
Mont.	1	582,000
Neb.	5	1,899,000
Nev.	2	205,000
N. H.	1	315,000
N. J.	1	1,050,000
N. M.	1	162,000
N. Y.	3	873,000
N. C.	6	1,535,000
N. D.	8	2,662,000
O.	3	669,000
Okla.	10	7,177,000
Ore.	4	1,896,000
Penn.	10	7,159,000
R. I.	—	—
S. C.	2	595,000
S. D.	4	1,426,000
Tenn.	12	5,369,000
Tex.	14	3,483,000
Utah	—	—
Vt.	—	—
Va.	1	600,000
Wash.	—	—
W. Va.	2	353,000
Wis.	8	2,928,000
Wyo.	2	309,000
Alaska	1	70,000

*State totals are for borrowers with headquarters within the state.

Bell's Low-Noise Amplifier Uses Semiconductor Diodes

A NEW DEVICE which has exciting possibilities as a low-noise ultra high frequency (u.h.f.) and microwave amplifier is under development at Bell Telephone Laboratories.

Although still in the experimental stage, preliminary results indicate that this device, which uses semiconductor diodes as the active elements, can improve the performance of many types of microwave receivers. It is relatively simple to construct and operate, and shows prospects of having a long life.

Noise is a major problem in the amplification of weak microwave signals. Commercially available amplifiers and converters add a considerable amount of noise to the incoming signal, thus decreasing the sensitivity of the receiving equipment.

A major reduction in this added noise can significantly improve the performance of radio receivers such as those used in radar, radio astronomy, over-the-horizon radio relay, and u.h.f. television systems. The diode amplifier holds promise of providing such a noise reduction.

This amplifier is one of a family of devices known as variable reactance amplifiers in which a variable reactance, or "varactor," serves as the active component. In the present device, the variable reactance is provided by a semiconductor diode (varactor diode) whose capacitance varies with the applied voltage.

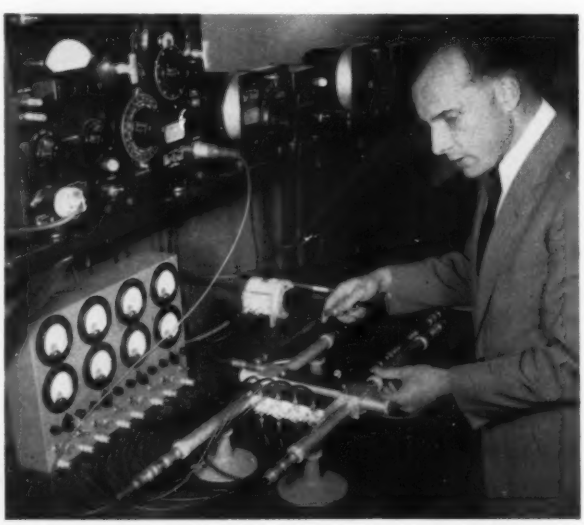
As with other varactor amplifiers, the applied voltage is derived from a high-frequency pump signal. This signal causes the diode to function as a time-varying capacitance and supplies the energy which is necessary to produce amplification. Low-noise amplification using varactor diodes was predicted by A. Uhlir Jr. of Bell Laboratories.

Amplification at 6000 megacycles was first demonstrated by M. E. Hines and H. E. Elder of Bell Laboratories. At the same frequency, G. F. Herrmann and M. Uenohara later obtained a bandwidth of 8 megacycles with a noise figure of five to six db.

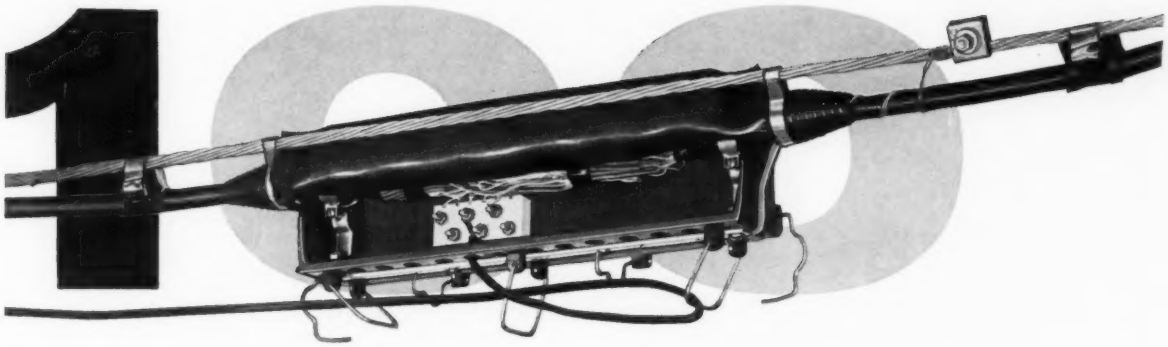
Gain was 18 db and the pump signal 12,000 megacycles. Gain can be traded for additional bandwidth if desired, and vice versa.

A traveling-wave amplifier configuration using arrays of several diodes shows promise of providing bandwidths of 25 per cent or more in the u.h.f. region.

Using four stages with the special diodes in such an array (see cut), R. S. Engelbrecht of Bell Laboratories has obtained a bandwidth of 100 megacycles at a 400-megacycle signal frequency,



R. S. Engelbrecht of Bell Telephone Laboratories is assembling equipment for testing a type of traveling wave amplifier employing four stages with special amplifying diodes.



Reliable ready-access terminals . . .

now in two sizes for cables up to 2.2″ in diameter

Reliable now offers Ready-Access Cable Terminals in two sizes for use with plastic jacketed, plastic insulated cables.

Catalog Series 100 – for cable up to 1.2″ O.D.

Catalog Series 200 – for cable from 1.0″ to 2.2″ O.D.

Catalog Series 100 and 200 units are easily installed and easily maintained terminal and splicing facilities. Up to four 6-pair Reliable Catalog No. 105 Terminal Blocks can be added to both Series Terminals, or the space can be used for loading coils. The flexible neoprene cover is conveniently folded back, as in upper illustration, while internal wiring is altered to meet changing requirements.

You will get interesting details by writing for Product Data Sheet No. 17, featuring Ready-Access Cable Terminals.

Reliable

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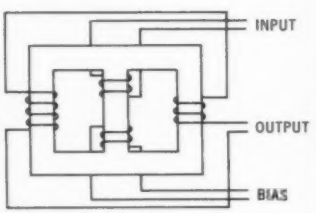
tubeless power supplies



More stable, permanent characteristics

Magnetic amplifier power supplies provide superior reliability with years of trouble-free operation and a high degree of stability.

Supplies utilizing saturable reactors and germanium rectifiers for B+ voltages eliminate tubes and resulting tube inventories.

Regulated output is achieved by self-saturating magnetic amplifiers in series with the primary circuit of the power transformer.

This is another progressive feature of the most advanced microwave system available. For detailed information, write Collins Radio Company, Sales Service, 1930 Hi Line Drive, Dallas, Texas.

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with a pump frequency of 900 megacycles and a pump power of 10 milliwatts. This experimental amplifier has a gain of 10 db and a noise figure of only 3½ db.

A single type of diode can be used to make an amplifier for any desired frequency from the high microwave region down to dc. The noise performance improves rapidly as the frequency decreases from microwaves down into the u.h.f. region, thus making such an amplifier potentially useful for u.h.f. television receivers.

Interesting aspects of the diode amplifier are its simplicity and potential reliability. Major components are the proper waveguide structures, the diode itself, and a suitable pump signal source.

It appears that these components can be assembled to provide a relatively inexpensive device. No refrigeration is required, and no magnetic fields are necessary. The low-noise characteristics are realizable at room temperatures.

Although the variable capacity effect is present in commercial diodes, Bell Laboratories' scientists have developed, under a Signal Corps contract, special diffused silicon diodes to maximize this effect.

Series resistance, which could be a source of noise, is minimized in these diodes. Units fabricated by N. G. Cranna of the Laboratories have an active diameter of about .002 inch.

The development of the varactor diode amplifier holds promise of providing a whole new family of low-noise amplifiers for the u.h.f. and microwave frequency ranges. These devices will complement the semiconductor diode up-converters recently announced by Bell Laboratories, which can also provide low-noise amplification.

General of SE Appoints R. J. White Vice President

Robert J. White, former director of personnel, has been appointed to the position of vice president—revenue requirements for General Telephone Co. of the Southeast, it was announced recently by the company's president H. E. Hussey.

As vice president—revenue requirements of General of the Southeast, Mr. White will be in charge of capital expenditures, expenses, revenues and earnings throughout the company's six-state area which includes Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Tennessee. He is also a member of the company's board of directors.

Mr. White has served as director of personnel in charge of employe relations for General of the Southeast since January 1957. He went to Durham from Muskegon, Mich., where he served as secretary and treasurer of General Telephone Co. of Michigan from 1951 to 1957 and was a member of the board of directors of that company during the last four years there.

Prior to 1951, he was employed in the auditing department of General Telephone Co. of Wisconsin with headquarters at Madison, and he also has fulfilled various assignments with the General Telephone System's subsidiary companies in Indiana and Illinois.

Mr. White is a native of Wisconsin and a graduate of Carroll College in Waukesha, Wis., where he received his Ph.B. degree in 1938.

M. J. Stooker Retires, SW Bell Promotes Four

Robert L. Bankson, general commercial manager for Southwestern Bell Telephone Co.'s Arkansas area, has been elected secretary-treasurer by the company's board of directors, effective Aug. 1.

He succeeds Marion J. Stooker, who retired on that date following more than 41 years service in the telephone business. Mr. Bankson moved to St. Louis on July 1, to prepare to take over his new job.

John E. Keith, St. Louis division manager, was appointed to succeed Bankson as head of the company's commercial department in Arkansas. Herold D. Ames, Wichita, Kans., division manager, moved to Mr. Keith's present job in St. Louis. John E. Oxler, general business office operations supervisor, succeeds Mr. Ames at Wichita.

Begin North America-Europe Direct Submarine Link

Shore operations have been completed off Clarenville, Newfoundland, for the first submarine telephone cables that will link North America directly to Europe's mainland, it was reported on July 22.

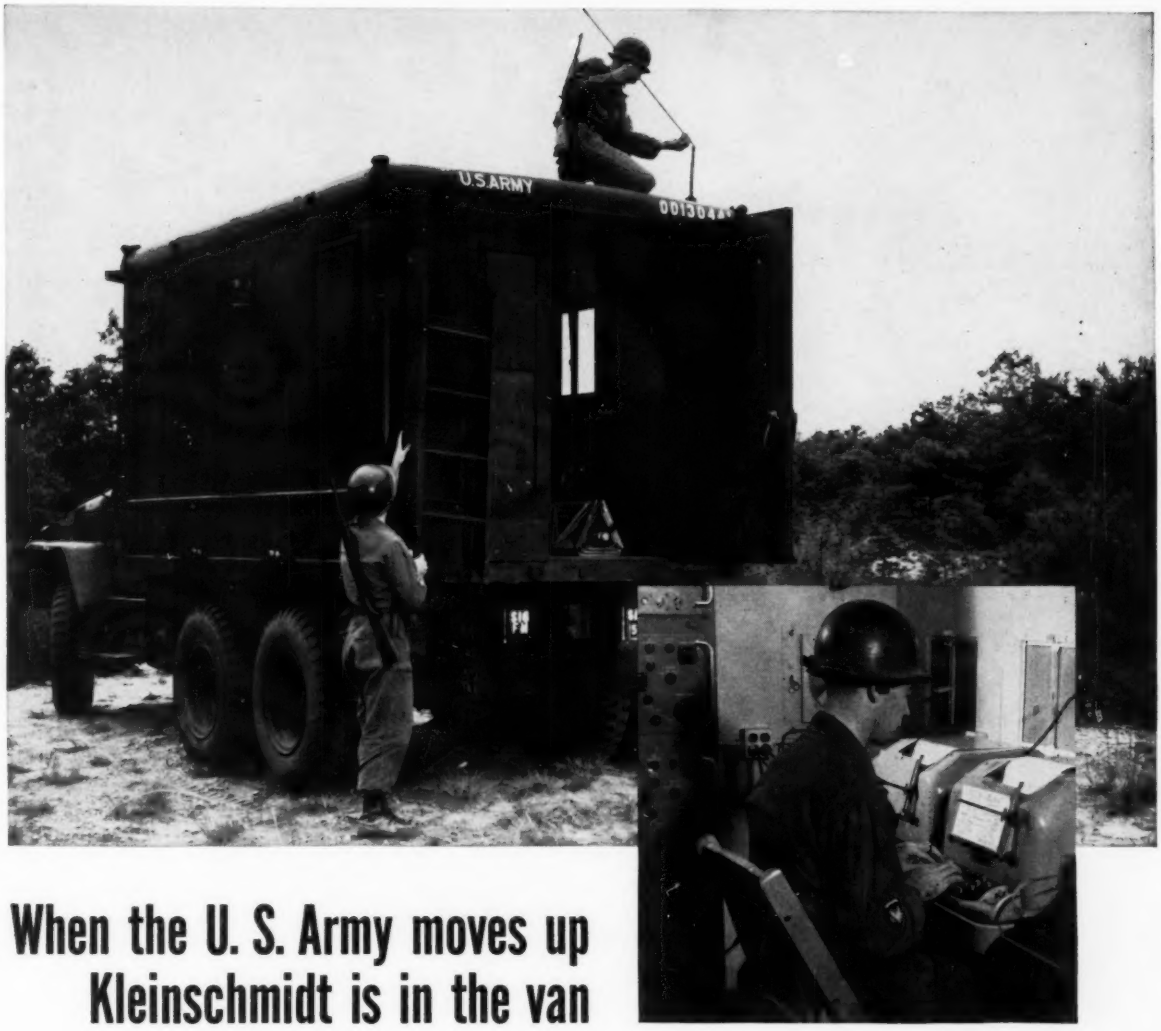
The American Telephone & Telegraph Co. said the cables will form the main segment of a system that will provide at least 36 voice circuits between the United States and Continental Europe.

Next summer, the 2,400-mile deep-sea portions of the cable system are to be laid. The cables are scheduled to go into service later next year.

France and Germany will be served by only 13 cable circuits each. The 10 other circuits will be available for other European nations.

Joins Minnesota Company

H. J. Hopkins, for several years associated with the Fowler Telephone Co.



When the U. S. Army moves up Kleinschmidt is in the van

Kleinschmidt page printers and reperforator teletypewriters receive and transmit teleprinted communications wherever a truck can roll.

As division headquarters advances in the field, it is imperative that communications with outlying units be maintained without interruption. Kleinschmidt teletypewriters and related equipment, installed in a U. S. Army cargo truck and transmitting by radio, provide a message center that meets every demand of mobility and dependable two-way communications. These Kleinschmidt units, developed in cooperation with the U. S. Army Signal Corps, furnish sender and recipient with an identical teleprinted original, eliminating misinterpretation and speeding the required action.

Research and development of equipment for transmitting and receiving printed communications has been a continuing project at Kleinschmidt for almost 60 years. This unparalleled store of experience, now joined with that of Smith-Corona Inc, holds promise of immeasurable new advances in electronic communications.

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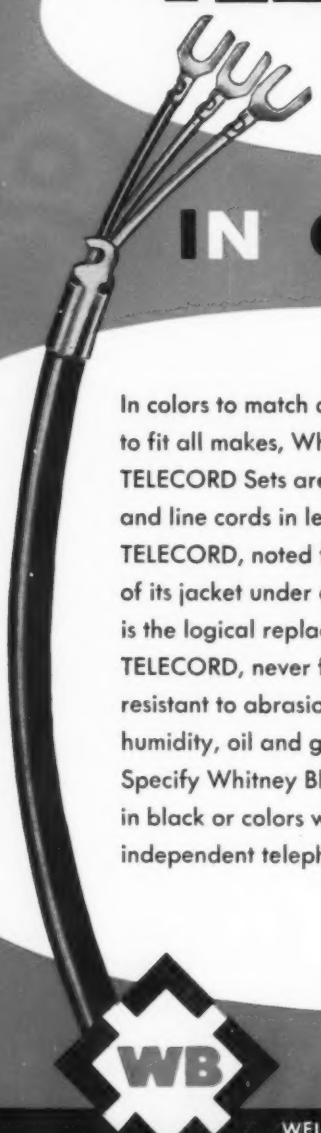


In colors to match all telephones and trimmed to fit all makes, Whitney Blake's famous TELECORD Sets are now available in hand set and line cords in lengths up to 25 feet.
TELECORD, noted for the toughness of its jacket under adverse conditions, is the logical replacement cord.
TELECORD, never frays and is highly resistant to abrasion, perspiration, humidity, oil and grease.
Specify Whitney Blake Replacement Sets in black or colors when ordering from your independent telephone supply house.

INDEPENDENT

WB

10-8

WELL BUILT WIRES SINCE 1899

WHITNEY BLAKE COMPANY

NEW HAVEN 14, CONNECTICUT

of Pella, Ia., has been named assistant manager of the Minnesota Central Telephone Co. of Hector, Minn.

TELEPHONE COURSES

Concluded from page 20

55 experiments on basic fundamentals, 42 experiments developed especially for carrier, 44 textbooks on basic and advanced electronics, needed to understand carrier, and 12 textbooks giving specific training on the Lenkurt 45A1 Open-Wire Carrier. An examination and consultation service is also included in the course.

Complete course outlines and other descriptive literature on the courses described in this article may be obtained from the following:

Telephone Training Institute, Piedmont Station, Portland 11, Ore.

Cleveland Institute of Radio Electronics, 4900 Euclid Ave., Cleveland 3, Ohio.

OREGON—WASHINGTON

Concluded from page 30

Gaines of North Bend, and Norman Howerton of Ilwaco.

Also elected were: Maurice Hull of Forks; Milton Larson of Lynden; William G. Pottratz of Cowiche; J. R. Reynolds of Naches; R. E. Rudolph of Ellensburg; O. E. Serwold Jr. of Poulsbo, and G. J. Stover of Mt. Vernon.

The Washington association elected the following officers: Mr. Rudolph, president; Mr. Serwold, vice president, A. J. Zimmerman of Seattle, executive vice president and J. W. Baker of Spokane, secretary-treasurer.

Iran to Establish Communications School

Iran is preparing to establish a government-operated telecommunications school to accommodate about 500 post-graduate students each year.

The Minister of Posts, Telephones & Telegraph has asked the American Embassy in Tehran for assistance, through either government or private channels, in obtaining study materials, books, technical journals, monographs, etc., for the school's library.

The minister also requested "detailed organizational" material on the administrative operation of American private telephone and telegraph companies.

Joins Florida Company

Maynard Matz has been appointed commercial superintendent of the Inter County Telephone & Telegraph Co., Fort Myers, Fla., as of July 15. Mr. Matz was formerly a district commercial manager with the General Telephone Co. of Ohio.

UNITED TELEPHONE COMPANY OF INDIANA, INC., SPECIFIES *ANOTHER* C&D BATTERY INSTALLATION

Chief Engineer R. E. Daniel of United Telephone Co., Warsaw, Ind., left, discusses latest installation of C&D telephone batteries with C&D District Representative Arnold McPhee.

Why is second-largest independent telephone operating system in U.S. sold on C&D?

This C&D installation at the new Warsaw, Ind., exchange of United Telephone Company marks another location for C&D batteries in the nation's second-largest independent telephone system.

Why C&D? When queried, a United Telephone Company spokesman summed it up this way—

. . . good performance, good delivery, good service, and competitive price.

. . . all the advantages C&D batteries have to offer were *as presented* by the C&D sales and service representative when the company was first contacted about using C&D batteries. United Telephone Company, he adds, has found no discrepancies in the story.

. . . periodic checks and inspections from the manufacturer help the customer with his routine operation.

United Telephone Company is sold on the performance of C&D batteries to do the heavier-duty work for dial systems, for C&D supplies "engineered power" for telephone industry growth.

In addition to the big, rugged hard-rubber jars, C&D supplies (and pioneered) rugged, one-piece clear plastic cases—lightweight, shock-resistant, heat-resistant, and hermetically sealed.

PlastiCal® (lead-calcium) batteries—compact modern design for full-float telephone service—provide dependable standby power for *25 years*. By reducing the number of over-charges per year, thus eliminating much of the voluminous record-keeping, the *PlastiCal* battery provides substantial savings.

For growing telephone exchanges, the C&D PlastiCell (lead-antimony) battery provides full .266″ positive plates, triple insulation, and 14 years of life in full float service.

And, as an added feature, *PlastiCal* and *PlastiCell* batteries both give you the Saftee-Vent, which prevents accidental internal cell explosions and serves as a convenient funnel for filling or testing.

Next time you specify—specify C&D. Ask your nearby C&D representative . . . or your telephone equipment supplier.

Bulletins T-532 & T-533 carry full details. Why not send for copies for your file?

C&D BATTERIES, INC.

of Conshohocken, Pa. ... Attica, Ind.

Since 1906

Sales and Service Offices in Principal Cities from Coast to Coast

Manufacturers of *Sure Cell* ® Industrial Batteries • PLANTCELL and PLANTCAST ® Batteries for Communications, Control and Auxiliary Power • Producers of *Autolay** Silicon Rectifier Chargers

*T.M.

John Garbutt, Inside Sales—Rochester, likes to get to the bottom of things.

On top of the situation . . . from below

You can see that John Garbutt of our Rochester sales office won't hesitate to go underground or do anything else necessary to make sure your supply orders are properly serviced.

John and all the other members of our nationwide distribution setup make it their business to get to the bottom of your needs for construction and maintenance supplies. Years of experience have taught them that you have 4 principal requirements.

They are: quality products, fast delivery, personalized service, and careful attention to all orders, regardless of size.

This kind of thinking is typical of a company that operates a full-time research program to bring you new and better telephone equipment. Your supply orders help us keep this program going and growing.

Do you have a supply problem that needs careful attention? Try the Stromberg-Carlson branch office in your area.

In Rochester our Sales Office and Warehouse is located at
1040 University Avenue
Telephone HUbbard 2-2200

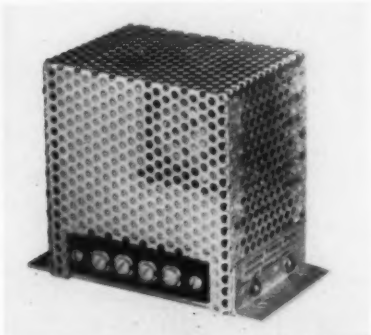
"There is nothing finer than a Stromberg-Carlson"

STROMBERG-CARLSON
A DIVISION OF GENERAL DYNAMICS CORPORATION
SALES OFFICES: Atlanta 9, Chicago 6, Kansas City 6, Rochester 3, San Francisco
Electronic and communication products for home, industry and defense

News on New Products

TRANSISTORIZED POWER SUPPLY—A transistorized power supply for use as a replacement for dynamotor and/or vibrator power supplies of mobile receivers and other low power devices has been announced by the industrial products division of International Telephone & Telegraph Corp.

The new power supply is a compact, lightweight dc-to-dc conversion unit designated as Type QH-020. It permits operation at CCS rating under severe operating conditions through the use of a high-power PNP transistor switching circuit employing a special pulse



transformer according to ITT. The moderate switching rate used is said to result in minimum noise interference. Silicon diodes are used exclusively in the rectifier section.

The type QH-020 has a dc input of 12.6 volts ±20 per cent at 1.60 amperes (nominal), 20 watts. The dc output is described as being 210 volts at 87 milliamperes (nominal), 20 watts. The unit has 6 per cent regulation, 90 per cent efficiency, and a ripple of less than 0.5 per cent. The power supply has a welded, cadmium-plated, formed steel housing with gray lacquer overlay. The housing is perforated to allow convection cooling by chimney effect. The temperature range is minus 55° C. to plus 75° C. The unit weighs 1 pound, 3 ounces, and measures 2 1/2 inches wide by 3 5/16 inches long by 3 7/16 inches high.

For those whose performance requirements are less exacting, a similar, more economical power supply, Type QH-810, of identical size and weight, is also available. Request NP906.

•

RECORDER-ANNOUNCER — A recorder-announcer machine capable of handling messages of variable length is being added to the line of such equipment manufactured by Automatic Electric Co.

Developed by General Telephone Laboratories, this single-channel, Type VMC unit utilizes an iron-oxide-impregnated rubber recording band on an aluminum drum to accommodate any message ranging in length from 12 seconds to four minutes. The variable length feature of this machine facili-

TELEPHONY PUBLISHING CORP.
608 S. Dearborn St.
Chicago 5, Ill.

Please have the manufacturer send me without obligation the literature indicated by the following numbers:

NP906_____;	NP907_____;	NP908_____;	NP909_____;
NP910_____;	NP911_____;	NP912_____;	NP913_____;
NP914_____;	NP915_____;	NP916_____;	NP917_____;
NP918_____;	NP919_____;	NP920_____;	NP921_____;
NP922_____;	NP923_____;	NP924_____;	NP925_____;
NP926_____;	NP927_____;	NP928_____;	NP929_____;
NP930_____;	NP931_____;		

Name.....Title.....

Company.....

Street.....

Town and State.....

8/2/58

How to stay on top of special needs

You have many subscribers whose needs are special—people who need something out of the ordinary to make their telephones more useful. We can help—here are two good examples taken from among the products we handle:

HANDS-FREE TELEPHONE: much more than just an instrument to provide conversation without the need to hold a handset, this telephone is superior to others on the market because (1) it takes less than 15 minutes to install; (2) it gives the user privacy; (3) its microphone is separate and non-directional; you can place it wherever convenient.

RECEIVER-AMPLIFIER RA-1000: this compact, transistorized device provides improved telephone service for the hard-of-hearing. It also boosts signal strength on long-distance calls or on conference hookups. It is compatible for use with any standard telephone, desk or wall-mounted.

The Stromberg-Carlson Branch Office and Warehouse in your area has these and other special-application instruments in stock.

STROMBERG-CARLSON

A DIVISION OF GENERAL DYNAMICS CORPORATION

Sales Offices: Atlanta 6, Chicago 6, Kansas City 8, Rochester 3, San Francisco

WHITNEY BLAKE

multi-pair distribution wire . . . . . .

EXTENDS SERVICE FAST IN RAPIDLY GROWING AREAS

Made in a variety of combinations from 2 to 16 pair, WB Multi-pair Distribution Wire affords a fast, economical method of extending service where needed. This wire has been used successfully to temporarily replace storm damaged circuits, to serve during relocation of lines due to road building or other construction and in many other ways. When used for temporary service it may be salvaged and re-used.

WB Multi-pair Distribution Wire is light in weight, is self supporting and is shipped in long lengths.

INDEPENDENT

WB

7-8 WELL BUILT WIRES SINCE 1899

WHITNEY BLAKE COMPANY

NEW HAVEN 14, CONNECTICUT

tates providing weather forecasts and general advertising messages.

The design of the Type VMC equipment permits messages to be recorded either locally, or from remote locations. Dictating a message is a simple matter, the company states. The operation of one key energizes an "erase" coil while the drum makes a complete revolution. When the old message has been removed, a steady lamp lights to indicate the machine is ready for recording. This lamp flashes to warn the user as the end of the recording period approaches.

During the time this equipment is in announcing service, the pickup head is automatically reset to the starting point at the end of each announcement, so that only the actual message—regardless of its length within the prescribed limit — consumes time. The power output of the amplifier is sufficient to deliver the recorded message to several hundred simultaneous listeners. If at any time during announcing service the audio output should drop, an alarm sounds.

The Type VMC recorder-announcer can be mounted on a 19-inch relay rack, and the height of the entire unit is only 33 inches. Request NP907.

•

SPRAY-DRIFT-LIMITING HERBICIDE—A new product promising effective weed and brush control on transmission and distribution line right-of-ways while cutting the spray drift hazard to a minimum has been placed on the market by The Dow Chemical Co. The new material is called Inverton 245—a 2,4,5-T product formulated in an invert emulsion.

The invert emulsion is a dispersion of oil particles in water—the reverse of a standard emulsion. This gives the spray mixture a thick, creamy consistency which is responsible for most of the unusual properties of the new product.

Inverton 245 is sprayed on vegeta-

"Golly...everybody's ordering Automatic's Transistorized Repeaters"

No wonder the young lady is amazed. Thousands of AT-2 and AT-3 transistorized repeaters were placed in service in the first year—and the orders keep piling in. Here's why:

These repeaters offer an easy, inexpensive way to raise transmission on trunks and long lines. When combined, they overcome up to 85% of the line loss, provide up to 14 dB gain. On existing circuits, you'll avoid costly cable-loading; on new circuits, you can avoid the use of heavier gauge wire.

There are other advantages you'll like too. Maintenance is far lower because transistors are used. No special power supply or cooling facilities are needed. And these repeaters are space-saving—8 mount side-by-side on a 19" rack.

Interested? Then write today for full details. Address:

Automatic Electric Sales Corporation, Northlake, Illinois.
Or call Fillmore 5-7111.

AUTOMATIC ELECTRIC

Subsidiary of **GENERAL TELEPHONE**

Stahl

SERVES THE TELEPHONE INDUSTRY!

Stahl Side Boxes — convert pick-ups into efficient Service Trucks.

Stahl TMI-76 — Lowest-cost Telephone Body in the Industry!

Stahl TMI-76 — Engineered and built to rigid specifications.

Stahl Cable Splicer Body — built for longest, hardest SERVICE!

MAIL THIS COUPON TODAY FOR COMPLETE INFORMATION & PRICES!

Check product in which you are particularly interested.

Stahl Metal Products, Inc.

3490 West 140th St., Cleveland 11, Ohio

NAME_____

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tion in large particles and does not break into a mist, Dow reports. This drops the possibility of damage to nearby crops from spray drift to a new low point. In addition, the product is a non-volatile free acid formulation, cutting the possibility of herbicide vapors causing damage on adjacent land.

The thick consistency of Inverton 245 causes it to cling tightly to branches and foliage. This permits spray crews to work in wet weather when conventional herbicides cannot be used, the company states. During 1957 trials, good brush control was realized from spray applications made just before, after, or even during rain showers.

There are indications that Inverton 245 can be used over a longer spray season than conventional herbicides, according to the company. Good top kills have resulted from applications made during virtually all seasons of the year. However, the potential for extending the spray season cannot be fully evaluated until current trials are completed. This extended spray season could be helpful in keeping spray equipment busy during more months of the year and in budgeting vegetation control costs over a greater period.

Inverton 245 may be used as a leaf-stem spray and promises to be effective as a broadcast basal application, Dow has found. The thick, white material is easily seen clinging to leaves and branches, making a positive marking device.

Mayonnaise is a familiar example of an invert emulsion. Inverton 245 is the first herbicide formulation developed to perform consistently under field conditions to take advantage of the characteristics of invert emulsions.

Standard spray equipment can be used to apply Inverton 245. Request NP908.

•

NEOPRENE-COATED DEAD-ENDS— Preformed Line Products Co.'s neoprene coated dead-ends are now produced in all sizes for jacketed all-aluminum and ACSR conductors. They provide a neat, safe and permanent installation. The Preformed dead-ends are applied directly on the jacketing; no stripping is required. Full protection is possible because the conductor is not exposed at any point, the company reports.

The application is easily made by hand; no tools are needed. There are no sharp edges to cut into the conductor's jacketing, no concentrated stress or fatigue points and no bolts to come

loose. The neoprene coating on the dead-ends aids in their application and removal and protects them from corrosion, Preformed states. They are ideal for use in highly corrosive areas both coastal and industrial.

The company states that low unit pressure distributed over a large area, creates the exceptional holding quality in these dead-ends. Preformed neoprene-coated dead-ends develop more than sufficient holding strength for the maximum loading conditions normally anticipated in field service. They will neither slip nor damage the jacketing material. They hold satisfactorily under maximum design tension in all weather conditions and operating temperature ranges. Request NP909.

•

RUBBER-TIRE DITCHER — Barber-Greene Co., has announced their new model 702-A rubber-tired ditcher, a mobile unit designed for narrow trenching in underground placement of telephone and other communications systems, as well as a number of other applications.

The new 702-A succeeds the model 702 used by telephone suppliers, utility companies, municipalities, railroads, and others.

Designed to dig a maximum of 40 inches deep, the 702-A may be equipped with either a chisel tooth bucket line digging either 3 or 5 inches wide; or a

SUTTLE

SUPPLY LINES

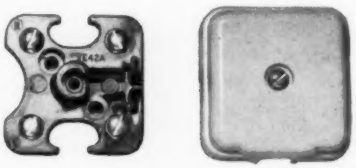
SUTTLE — Suppliers of Equipment to Telephone Men — Since 1910

DIAMOND WIRE QUICKLY AVAILABLE

For connecting open wires together or to cable terminals, **DIAMOND WIRE** offers its neoprene covered Bridle Wire. This rubber insulated, soft tinned copper wire offers exceptional strength and holding power. The neoprene insulation is permanently welded to the conductor. All types of **DIAMOND** Telephone Wire are stocked by **SUTTLE** in quantity and usually can be delivered immediately. Check **SUTTLE's** prices!

FOR CABLE RELIEF, TEMPORARY SERVICE

Fast, low cost construction is possible with **ANSONIA** Lightweight Rural Distribution Wire. Has plastic-insulated #19 or #22 A.W.G. soft copper conductors in color-coded pairs cabled around a polyethylene-insulated .109 high-strength galvanized steel support wire. Each conductor pair has a controlled different length twist to avoid crosstalk. Breaking strength of 1800 pounds makes it ideal for temporary service or cable relief. Check **SUTTLE's** quote on your needs.



NOW — *PLASTIC* COVERS 4-POINT BLOCKS - .36 EA.

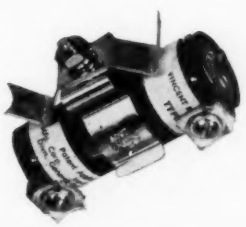
Only **SUTTLE** mfg's. the industry's standard four-terminal connecting block *with non-shorting plastic covers.* Available in brown or ivory, these covers are high dielectric butyrate—completely shorting resistant. **SUTTLE** is also your sure source for standard 10-terminal connecting blocks, and three sizes of *plastic* block covers. For fast delivery of these connecting blocks *and* plastic covers, send your orders today to **SUTTLE,** or your local distributor.

COOK TERMINAL FOR PLASTIC CABLE

Designed and made by **COOK ELECTRIC,** the PLX Cable Terminal is for use on plastic cable which is looped through the terminal without cutting the wires and the desired pairs are terminated for distribution. Also used for junctioning and terminating cable. Supplied with or without Minigap or Mytigap arresters mounted in an arrester plate; specify whether or not protection equipment is needed when you order from **SUTTLE.**

ERICOFON EXTENSIONS HAVE WIDE APPEAL

Extension installations mean added revenue and **NORTH ELECTRIC** has the extension telephone with the greatest sales appeal of any unit. The one-piece **ERICOFON** is balanced so that holding it is virtually effortless. Available immediately and in quantity from **SUTTLE,** in your choice of red, ivory, green, blue, and light and dark gray. Use **SUTTLE's** S.E. 283 plug and S.E. 404 jack with **ERICOFON.** In stock at Lawrenceville.



VINCENT RELAY DEPENDABLE IN ACTION

The **VINCENT** Rare Gas Relay serves as an automatic relay for eliminating noise where two-party grounded ringing service is used with a metallic talking circuit. This relay will not conduct interference circuits from ground, but *will* carry high voltage ringing circuits coming through ground. Ringers must be adjusted. Sturdily built and very dependable in action. Stocked by **SUTTLE** in quantity and available immediately.

Manufacturers, suppliers, and printers to Telephone Men

For further information, specifications or quotations on these telephone supplies— write, wire or telephone—

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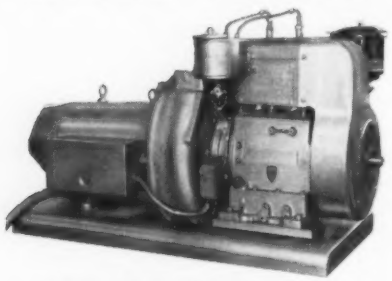
Phone: DEarborn 2-3108

NO DROOP DROP or BREAK

AMAZING U.S. MICRO-POWER



SENSES...

. . . the slightest drop in voltage. Actually *anticipates* power failure BEFORE voltage drops below a usable level.

ACTS...

. . . automatically to guarantee absolutely uninterrupted power. Not one precious second lost in load transfers.

SAVES...

. . . UP TO $300 PER MILE on new Micro Wave installations. Just one compact Micro-Power Unit replaces a costly array of complicated equipment.

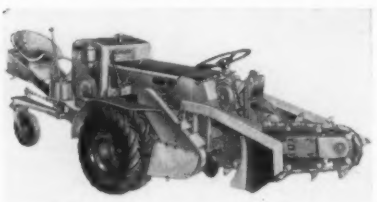
For Complete Information Write . . .

UNITED STATES MOTORS CORPORATION

102 W. FIFTH AVE. OSHKOSH, WISCONSIN

hook tooth line digging 3½ or 5 inches wide. This choice of bucket lines makes the machine readily adaptable to a wide variety of underground soil conditions, the company states.

Maintenance costs promise to be reduced with the installation of special headshaft and boom support bearings: a new large radius boom foot end with an optional foot-sprocket for extremely



tough digging. A new positive boom hoist lock makes for more positive maintenance of grade at any selected digging depth, according to Barber-Greene. Also, the boom takeup, for adjusting the slack in the bucket line has been made more readily accessible.

A follow-up scraper may also be furnished as an optional accessory to insure a cleaner trench with minimum handwork.

Greater horsepower and a new reduced bucket line speed allow the new 702-A to dig through much tougher materials. A new hydraulic caster hoist makes height adjustment easier and more accurate. Optional dual drive wheels permit operation on more unstable base and provide greater flotation and traction. Similarly, optional dual caster wheels increase stability still further and permit the 702-A to straddle previously cut ditch when necessary.

Higher over-the-road towing speeds are now possible through the application of tapered roller bearings in the drive wheels and through an improved towing hitch. Request NP910.

•

LINE CONSTRUCTION BODY—Utility Body Co.'s series C line construction body is a money-saving tool. The streamlined appearance of the series C line body does not belie the fact that its construction is rugged and durable, the company states.

The series C line construction body is designed to carry present-day tools and supplies for both copper and aluminum transmission and service systems.

The storage space is constructed to carry all standard tools and personal items as well as a large inventory of pole line hardware.

The left, or street side compartment section, is available in three different

layouts. The series C body can also be provided with special compartment layouts in special sizes. Request NP911.

•

EXPAND BATTERY CAPACITY RANGE—Exide Industrial Division of The Electric Storage Battery announces it has expanded its plastic-jar line of

EWA stationary flat-plate batteries to offer a complete range of capacities for power requirements in telephone, microwave, emergency lighting, rural electrification, and in general power service.

With the addition of three new sizes, EWA battery capacities now range upward in 60-ampere-hour increments from 180 to 660 ah (at the 8-hour discharge rate).

Added to the line are 13-, 17- and 21-plate single-cell batteries with capacities of 360, 480, and 600 ah respectively. The line now includes two- and three-cell batteries with seven plates per cell and single-cell batteries with from nine to 23 plates.

The grids of the positive plates contain Silvium, an exclusive alloy of silver, lead and other metals, the company says. This alloy provides protection against damage caused by overcharging.

The explosion-control device is a safety feature used on other Exide stationary batteries for gas venting. Exide says it consists of a polystyrene hood or baffle over the plates which collects the gases and channels them through a

cylinder vent and plastic vent plug. The cylinder vent accommodates a pilot-cell hydrometer.

Electrolyte level lines are marked on all four sides of the jars. The covers, according to the company, are bonded permanently to the jars, for leak-proof construction. Seal nuts and gaskets prevent seepage around the heavy, square terminal posts. Molded ribs at the bottom of the jars support the separators and position the negative plates.

Ribbed microporous separators and spun-glass Vitrex retainers insulate the plates. Uniform, high porosity of the separators permits free passage of electrolyte, Exide says, assuring delivery of high rates of current at maximum voltage. The retainers hold the active material in place at the grids.

All EWA batteries are supplied either charged and filled with electrolyte, or dry-charged. Request NP912.

•

PHOTOCOPYING MACHINE—A compact, high-speed photocopy unit, the Transcopy Meteor developed by the Remington Rand Division of Sperry Rand Corp., exposes, develops and prints finished copies of originals up to 15 inches wide and of any length in one half minute or less, according to the company.

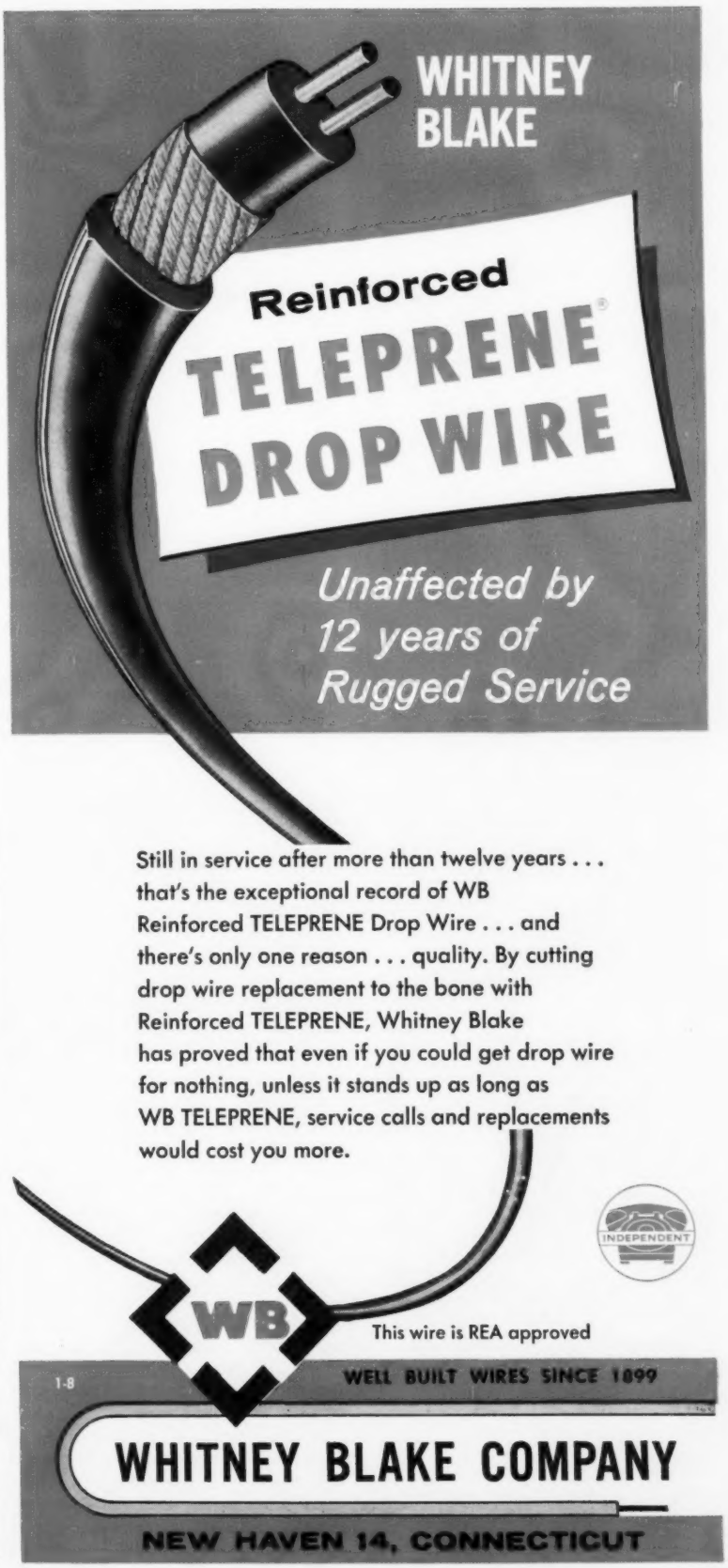
The two-tone (gray-rite and mist-gray), scientifically engineered photocopier can be operated anywhere. The Meteor is designed specifically for use under fluorescent or bright office lighting with the exclusive, built-in filter safety paper.

Transcopy Meteor can be plugged into standard electrical outlets and no installation is necessary.

The over-all dimensions are: length, 26½ inches, width, 15½ inches, height, 9¼ inches and throat width, 15 inches. Request NP913.

•

TELETYPE AUTOMATIC SEND-RECEIVE SET—The new Teletype automatic send-receive set operates at 100 wpm. It provides facilities for typing, tape punching, tape transmission, tape reception, sending and receiving page copy on message paper or multi-part


WHITNEY
BLAKE
Reinforced
TELEPRENE®
DROP WIRE
Unaffected by
12 years of
Rugged Service
Still in service after more than twelve years . . . that's the exceptional record of WB Reinforced TELEPRENE Drop Wire . . . and there's only one reason . . . quality. By cutting drop wire replacement to the bone with Reinforced TELEPRENE, Whitney Blake has proved that even if you could get drop wire for nothing, unless it stands up as long as WB TELEPRENE, service calls and replacements would cost you more.
INDEPENDENT
WB
This wire is REA approved
1-8
WELL BUILT WIRES SINCE 1899
WHITNEY BLAKE COMPANY
NEW HAVEN 14, CONNECTICUT

ONE MAN CAN MEASURE FASTER, MORE ACCURATELY

WITH A *Rolatape* MEASURING WHEEL

Take all your outdoor measurements this modern, time saving way. ROLATAPE reduces the risk of human error, since it records precise measurements in feet as it is rolled along—automatically and in full view of the operator. Sturdy, lightweight; equipped with automatic brake and built-in stand. Handle folds compactly.

SEND TODAY FOR FULL DETAILS

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Santa Monica, Calif.

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business forms and tape as a by-product of both transmission and reception. It also has a built-in control system for remote apparatus.

This send-receive set will function both "off" line locally, or "on" line over communication channels. This unit measures: 39 inches high, 36 inches wide and 18½ inches deep, with a keyboard projection of 4¼ inches. Request NP914.

•

TRENCHER — Addition of the Auburn Gear-Draulic trencher to the list of power-matched attachments for the Work Bull 202 industrial tractor has been announced by officials of Massey-Ferguson Industrial Division.

The rig which digs up to 600 to 800 feet an hour, compensates automatically for varying ground conditions, and handles trenches up to 6 feet deep in 6, 8, 10, 12 and 14-inch widths, the company says. Quick installation is possible because of the specially geared spacer for the Gear-Draulic trencher.

Depth control is regulated by a two-way hydraulic valve, and all operations are controlled from the driver's seat. Variable speed and power control is provided by the Gear-Draulic drive which permits the rig to compensate for changes in ground condition, according to the company.

With its trencher attachment, the rig is used for handling utility lines, sewers, irrigation ditches, foundation footings, laterals, gathering lines, and other jobs.

The trencher can dig straight down from the starting position, or can backtrench underneath sidewalks, streets and other obstructions. The digging boom is operated hydraulically and it has a vertical operating arc in excess of 190 degrees.

A crumber and grader attachment is available as optional equipment, as are special bits for digging rock, shale and frozen ground. Request NP915.

•

REEL TRAILER AND CABLE LAYER — A new, low-cost, hydraulic-operated reel trailer that can be converted into a cable layer for plowing in direct burial cable and wire is now being marketed by F. B. Ryan Mfg. Co.

Hydraulic cylinders on each side provide independently operated wheels and the frame of the machine, which carries the reel, is rigid. This feature allows the frame of the machine to be leveled, keeping the reel arbor and the reel level, on side slopes with as much as a 30 per cent frade. Lock pins are provided to carry reels in the raised position, without strain on the hydraulic system, the company states.

The combination reel trailer and cable layer is equipped with electric brakes, hydraulic tongue jack, fenders, side shields, running boards, hand rails, dual stop and tail lights and license bracket. It can be equipped with either 9.00 x 20 or 10.00 x 20 tires.

When used with the cable-laying attachment, it will place cable to a depth of 24 inches, with an extreme depth reach of 30 inches in common earth. When used for placing wire or cable, it can be pulled by small crawler-type tractors or large rubber-tired tractors with drawbar pounds pull of 8,000 to 15,000 pounds, depending on the type of soil and depth of placement, according to the Ryan company.

The cable laying attachment for this machine is a unit with a weight—complete with cable-laying blade—of about 750 pounds. It is small enough to be transported in a pick-up truck. This attachment will handle one or two small cables or wires with an over-all outside diameter up to one-inch.

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NYLON
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The machine itself can be equipped with an extra reel shaft, with removable brackets, to permit the handling of two reels for placing two cables or wires at the same time. Being a pull-type machine, it can be used to place cable across streams or swampy areas by using a tow cable or a winch line, the company reports.

This machine when used as a reel trailer, will handle reels up to 8 feet in diameter, up to 48 inches wide and will lift up to 8,000 pounds in weight. It is provided with adjustable brackets for the reel arbor, which permits it to pick up reels as small as 30 inches in outside diameter. It can also be adapted for hauling poles, according to the company.

Raising and lowering of reels and raising and lowering of the tongue of the machine, is handled by a hydraulic system that is actuated by hand pumps. Request NP916.

•

AMPLIFIERS — Improvement of its service through installation of new equipment is being considered by the General Telephone Co. of California, following conferences with the Altec Lansing Corp.

Altec, which manufactures home high fidelity components and commercial sound equipment, has announced development of a variety of new products for telephone company use.

Equipment under discussion, which Altec says is ready for immediate delivery, included the S17B program amplifier, the 444A, 438A and 436A compressor amplifiers, and the 447 transistorized repeater amplifier.

In addition Altec engineers demonstrated the company's new experimental distant talking conference system which enables a number of people to talk to each other through a system of microphone and speakers using telephone lines over long distances. Request NP-917.

•

CABLE LASHER—The new Hubbard Cable Lasher consists of a lashing tool and tube of precoiled lashing wire and will lash cables up to 1¼ inches in diameter using messengers up to 5/16 inch in diameter. Spans of any length, according to the company, can be handled. It is necessary, however, to have sufficient lashing wire around the messenger wire at the start to complete the job. On long spans, additional coils or parts of coils must be spliced to the first coil, with an appropriate sleeve and tool, at the beginning of the operation as coils cannot be added if wire is exhausted in midspan. After wires

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Hardly larger than a package of your favorite cigarettes, these new Klein Midget Pliers will simplify many of those small jobs where space is confined.

Midgets in size but giants in performance, they solve major problems when wiring up electronic assemblies; making model trains, airplanes, automobiles, or in any extremely small or confined work.

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321-4½ Long Nose Plier	**4½ in.**
322-4½ (Without Knurl)	**4½ in.**
224-4½ End Cutting Plier	**4½ in.**

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GREENLEE Pushers are available in two sizes: No. 790 for ¾" to 4" pipe . . . No. 795 for pipe over 4", concrete sewer pipe, large ducts. Average performance of No. 790, shown above with power pump, two feet per minute. Write for literature.

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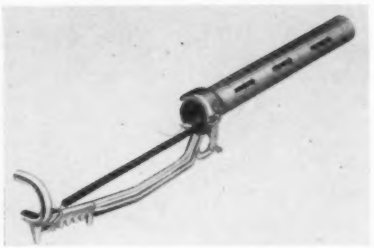

are spliced, tubes are taped together. The 2 inch tube contains 150 feet of wire.

A cable guide is used when larger size cables are being lashed to support the weight of the cable and facilitate operation.

Complete instructions for using the lasher and tables of lengths of lashing wire required for each job are described as being included with each tool. Request NP918.

•

MICROWAVE POWER MEASURE—Sierra Electronic Corp., a subsidiary of Philco Corp., announces development of three new waveguide water loads.

The waveguide water loads provide a convenient and accurate means of measuring microwave power when used with the Sierra model 190A calorimeter and the 189A thermopile. The loads can also be used independently as high power, low VSWR terminations at the applicable waveguide frequencies. Model designations and waveguide sizes are as follows:

	Description	Waveguide Size
SL187B	SL-Band Water Load	4.460x2.310
S187B	S-Band Water Load	3x1½
X187B	X-Band Water Load	1x½

Request NP919.

•

SAFETY YELLOW JACKET—A new safety yellow, high visibility jacket has been developed by Plastimayd Corp. for use by utility, construction, maintenance and road crews. It is fabricated from a high visibility yellow color approved for hunters and outdoorsmen by a recent series of field tests.

It enables crewmen to be seen, especially while making emergency repairs in stormy weather and at night when high visibility is essential, the company says. Made of Bakelite Krene, it also offers high insulation safety plus water and windproof protection.

The specially formulated 12-gauge Krene has a dielectric resistance of 9,600 volts, which exceeds the requirements of the Flammable Fabrics Act. The jacket resists deterioration from acids, oils and alkalis, stays soft and flexible in cold weather, and will not rot or mildew when stored wet, according to the company. It can be cleaned with soap and water.

Plastimayd's safety yellow jacket is cut to fit over outdoor clothing and features an attached red parka hood in a "Hideaway" collar. It is available in small, medium, large and extra large sizes. Request NP920.

•

DRIVE-UP BOOTH—The "drive-up" telephone booth pictured here is now available in five different models, the Suttle Equipment Co. announces.

The manufacturer claims that this design has been developed to meet all

installation conditions. Both the "drive-up" and the "walk-up" models may be mounted either in or on concrete.

The sign post, signs, and lights are optional. Request NP921.

•

FASTENING TOOL—A new fastening tool which is said to reduce fasten-

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For original and replacement installations

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(Type C Distribution Wire)

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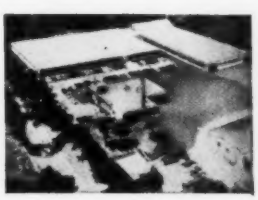


ing time in telephone installations by 50 per cent has been introduced for use by the Ramset Fastening System, a part of Olin Mathieson Chemical Corp.

Called the R-260, it is of the Shure-Set type and utilizes the power of a swung hammer to drive studs into a variety of non-brittle surfaces and light gauge metal.

Controlled tests comparing Shure-Set fastening to masonry drill fastening revealed the following, according to the company:

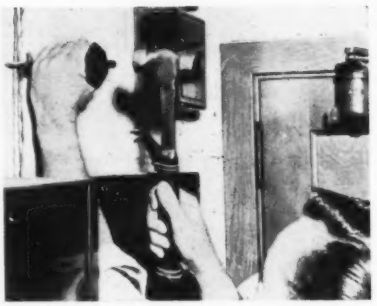
Fastening 100 feet of I.W. cable to concrete by drilling took two hours and two minutes per 100 feet; Shure-Set required only 38 minutes for the same job.

Using the older method to fasten a section of molding to cinder block took twelve minutes; with the aid of Shure-Set the job was completed in two minutes, or five times as fast.

The survey also revealed that in fastening backboard to concrete, each fastening could be made in one-half minute with Shure-Set. Previously, it had taken five minutes to complete each individual fastening.

The company reports that the new tool is simple to operate, having only four moving parts.

As an added feature, the company



says that the tool is supplied with a drill holder so that a worker may drill holes manually, wherever necessary, with the same tool.

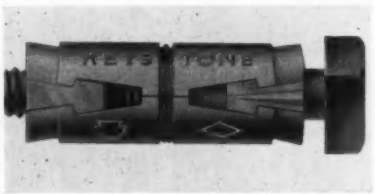
Since Shure-Set can be used in non-brittle surfaces both outside and inside, fewer fastening tools are required. For any of these surfaces the workman, it is claimed, merely has to select the proper fastener, hammer it into the desired surface, and the fastener is securely seated. The tool drives threaded studs as well as pins. Request NP922.

•

PARALLEL EXPANSION SHIELD—The development of a heavy-duty parallel expansion shield for anchoring to masonry was announced recently by the Diamond Expansion Bolt Co.

Named the Double Keystone Shield, the company states that the new anchor provides a built-in nut-stop that prevents overtightening and nut pullout. Once inserted, the Double Keystone becomes a permanent fixture that can be reused for anchoring other objects by simply removing the bolt.

Available in sizes from ¼ inch to 1¼ inch bolt diameter, the Double Keystone's precision cast parts with uniform bevels and radii allow easy expansion. Complete distribution of the



stress load is assured, thus reducing the danger of masonry fracture or spawling, according to the company.

Maximum holding power is developed through the Double Keystone's unique parallel shield expansion from end to end, which accommodates variations in the insertion hole's diameter. Request NP923.

•

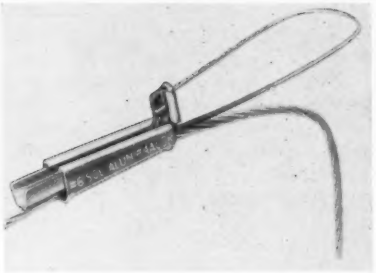
EARTH-BORING MACHINES—Highway Trailer Co. announced that it has completed over-hauling of all models of its earth-boring machines, has made obsolete several old models, and has added new features to the entire line.

Heavy duty adjustable clutches are now standard equipment on all Highway earth-boring machines, the company says. The number of plates has been increased from six to eight which provides an additional 33-1/3 per cent more clutch. Improved linkage on the shifter shaft allows the operator to exert 45 per cent more pressure on the manual controls. Shifter shafts have been changed from an inch diameter, keyed, to 1¼ inches in diameter, splined, which it is maintained will eliminate breakage when this greater pressure is exerted.

These new clutches, according to Highway, also enable the company to offer integral winches on all models of their machines. The winches mount on the intermediate case and utilize all the speeds of the machine. These features, plus integral and telescoping derricks, provide all Highway earth-boring machines with the dual capacity both to dig the hole and set the pole. Request NP924.

•

WEDGE CLAMP—A new Wedge Grip Clamp for triplex service drops that will save installation and service time, is now offered by Porcelain Products Inc.



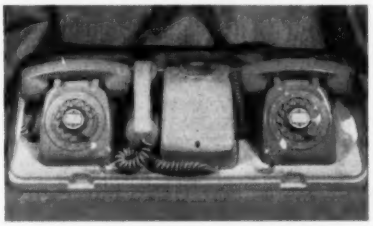
Known as Porcelain Products' No. 1060 wedge grip clamp, it is made entirely of stainless steel and heat-treated aluminum for greater strength, plus the highest rust and corrosion resistance, the company states.

For use at the pole and house end of a triplex service drop, the 1060 wedge clamp, the company states, requires less effort to install, and once up, will stay up. Because of its compactness and its simplicity of design, it can be installed with line gloves on, as all parts stay together while handling the clamp.

The 1060 clamp can be re-used because it will never become deformed or distorted, even under maximum loading, according to the company. Request NP925.

PLASTIC TELEPHONE-CARRYING CASE—Gladwin Plastics, Inc., has announced the development of a merchandising aid to assist telephone companies in selling additional services, such as extensions and colored telephones.

The carrying case is designed to be carried on an installer or repairman's truck so that the installer or repairman



can make an effective display of colored telephones without special sales training, Gladwin reports.

Trials have proven, the company states, that when this case containing three full-size telephones is taken into the customer's home or office by the installer or repairman, the customer will initiate inquiries approximately 85 per cent of the time, thus giving the installer or repairman an opening to sell additional services to a very receptive customer.

Another advantage of the case, says Gladwin, is that if the customer indicates an interest in a particular color, it is often possible to install the telephone immediately without making another installation trip.

The company states that its GP-2050 case is designed to hold either Western Electric or Kellogg instruments, and the GP-2075 case is designed to hold Automatic Electric instruments, including the Type 80, Type 90 and Type 83. Request NP926.

•

HIGH-SPEED CARD FILER—A new card filing machine that is said to arrange punched cards in any desired sequence at speeds better than two and one-half times faster than its predecessors has been introduced by International Business Machines Corp. Known as the IBM 88 Collator, the new high-speed device is the most recent addition to the product line of the company's data processing division.

Principal function of the new IBM 88 Collator is to compare two files of punched cards simultaneously in order that the cards can be matched, merged, selected, and sequence-checked for subsequent accounting operations. With the IBM 88, cards are entered into the machine from card feeding devices at

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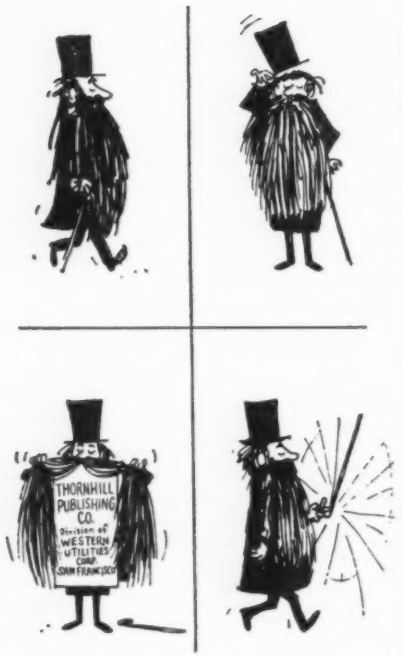

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each end. The primary or main feed consists of a file feed device that can hold up to 3,600 cards, and the secondary feed is a conventional card hopper. Cards enter from each feed device at the rate of 650 per minute, the company says, so that with both feeds in use, up to 1,300 cards per minute can be processed.

IBM gives an example of the Collator's performance by citing the fact that a sales analysis card merging job that formerly took a minimum of eight hours to perform with an earlier model collator can now be performed by the new IBM 88 in only three hours.

A major feature of the 88 Collator, according to the company, is its nonstop stackers which enable the operator to remove cards from any of the five card pockets without the need for stopping the machine and with no danger of card jams. Other important features are the error detection circuits which are designed to guard against double punches and blank columns on the card record, and the sequence-checking units built into the card feeding devices which enable the IBM 88 to perform identical or completely different operations in each feed at the same time. Request NP927.

•

AUTOMATIC VOLUME AMPLIFIER — Amplifier Corp. of America, announces that it has developed and put into production an automatic volume control amplifier which maintains a

constant output within ± 1 db with input changes of 30 db. Rapid automatic gain reduction prevents syllable clipping and slow automatic gain increase avoids automatic control at syllabic frequencies.

The A. V. C. amplifier is described as basically consisting of a two stage push-pull circuit. The operating conditions of the input stage have been determined so as to provide optimum limiter action with minimum distortion. The input may be connected directly either to a balanced 600 ohm line (with either or neither side grounded) or it may be bridged across a 600 ohm line without upsetting line impedance.

Used in conjunction with radio broadcast transmitters, telephone circuits, public-address installations, wired music systems, factory and department store paging systems, this amplifier has other uses including automatic fading between two signals and compression or expansion (or both) of any program material.

For broadcast application, the gain control feature, according to the company, automatically keeps modulation at peak levels without exceeding modulation limits and eliminates the element of human error. For public address and paging system applications, automatic compensation is made within maximum limits of 40 db, or 100 to 1 in signal voltage to keep the output level constant (within 2 db) so as to adequately compensate for drastic change in input volume caused by variable distances between announcer and microphone.

This amplifier is said to cut down on power requirements for modulation and paging systems by operating modulation devices and public address amplifiers at top levels without blasting.

An on-off switch, a meter transfer switch and an attenuator are its only controls, the company says. A special double-scale meter is made to serve two functions, for output level (VU) readings and for indicating the degree of attenuation at any given instant.

The amplifiers frequency response is rated at ± 1 db from 20 to 20,000 cps. It has an overall gain of 35 to 38 db with a signal-to-noise ratio of 60 db. Its rated power output is 6 milliwatt at 2 per cent total distortion. Maximum distortion is less than 5 per cent under conditions of full 30 db compression. An adjustable gain reduction and gain increase speed control is described as enabling variation in its attack and release timing. It is equipped with a self-contained power supply which is designated for 110/220 volts, 50/60 cycles with a power consumption of 30 watts, and is housed in a ventilated and shielded cabinet designed for standard rack-panel mounting. The amplifier's dimensions are: width 19 inches; height 7 inches; depth 8¾ inches. Net weight is 25 pounds. Request NP928.

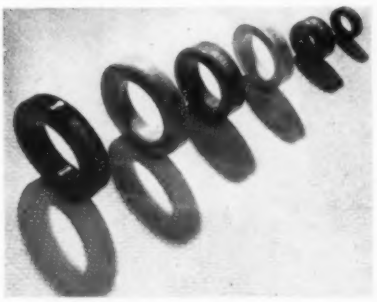
•

TOROIDAL CORES — New Genalex III toroidal cores are now available from Wallace E. Connolly & Co.

Genalex toroidal cores, according to the company, feature high stability of inductance with time, high stability of inductance after subjecting the core to a dc saturating flux, high Q, low harmonic distortion, low temperature coefficient of inductance, negligible external field, and small overall size.

Color-coded Genalex cores are available in five standard ranges of permeabilities: 14, 26, 60, 125 and 140. They are available in seven standard sizes running from 0.500 inches O.D. to

1.350 inches O.D. Every Genalex core is marked with its exact effective winding permeability within a tolerance of ± 1 unit, the company says. This is shown as the inductance value for a coil of 1,000 turns on the core. Genalex cores have a temperature coefficient whose mean slope is of the order of 100 to 120 parts/million/C.

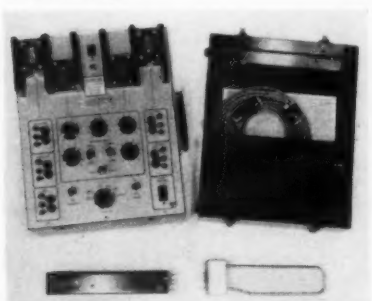


Genalex III cores are formed from a ternary alloy of nickel, iron, and copper which is pressed in one piece with a special finish of insulating lacquer which is said to render the coil impervious to moisture and to provide excellent insulation.

Genalex cores are a product of Salford Electrical Instruments Ltd., a subsidiary of The General Electric Ltd. of England. Connolly & Co. is national headquarters for Genalex toroidal cores. Request NP929.

•

TELEPHONE REPEATER TEST — The availability of a light weight telephone repeater test unit (RTI 0230), using the normal repeater networks for strapping instead of patching an external network for verifying repeater gain, has been announced by the Hallamore Electronics Co., a division of The Siegler Corp.



In making line impedance and return loss measurements, or for maintenance of telephone circuits, the Hallamore RTI 0230 can be used with either Western Electric E-type or Automatic Electric transistor repeaters, the company says. The unit checks series and shunt connected repeaters for insertion gain either separately or in combination (either an E-2 or E-2-3 circuit) when

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EXCHANGE AREA CABLE

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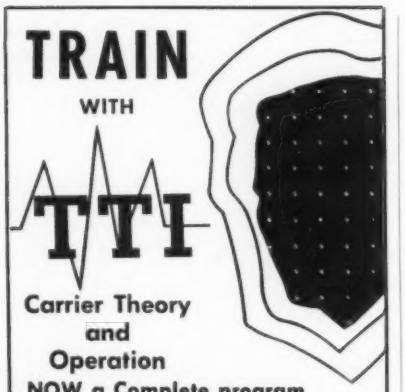

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Other SIMPLEX lightweight Loaders
A1338—Aluminum Pole Pulling & Straightening Jack; 15 tons cap., weight 63 lbs.
A1022—Aluminum Ratchet Lowering Jack for general lifting and lowering. Capacity 10 tons, weight 42 lbs.
Simplex Jacks
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working between their normally connected line impedances.

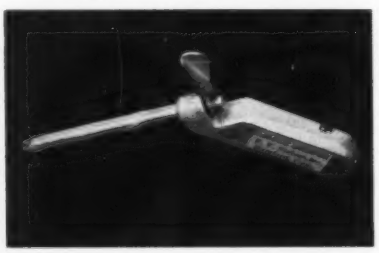
Standard test equipment, (conventional AC-VTVM and audio oscillator), the company maintains, is all that is required for measurements. A plastic bound chart for making phase angle determination is included with the unit.

The RTI 0230 is housed in a carrying-case-type cabinet and has a single control panel containing function switch, decade controls, line connections, and repeater plug-in connectors. The unit is 16⅜ inches long, 14⅝ inches wide and 6¾ inches deep and weighs 20¾ pounds. Request NP930.

•

WIRE CUTTER—A wire cutter based on new principles is proving ideal for work on switchboards and in crowded electronic chassis, and has already been adopted for assembly line and service work by several large companies. Called "Little Snipper," the cutter is manufactured by E. V. Nielsen, Inc.

Little Snipper features a radial shearing action, implemented through a spring-loaded thumb lever. In use, the Little Snipper is held like a pistol; the



thumb naturally falls on the lever intended for it. Wire to be cut is picked up in the cutting jaw at the end of the barrel, and light thumb pressure applied. The 10-to-1 leverage makes it easy to cut copper wire up to No. 8, or stainless steel up to No. 20, the Nielsen company reports. The shape of the Little Snipper permits flush cutting in corners, between fins on terminal strips, and similar "impossible" places.

This wire cutter has a second time-saving use. Workers use the tool not only to cut wires, but also as a pincers to retrieve loose ends or to hold work in place for soldering or brazing.

Three standard sizes are available from stock—2-inch, 4-inch, and 6-inch. Practically any length can be made to order. Cutting members are of aircraft steel for strength and long life, and the company states the units are easily disassembled for sharpening if necessary. Request NP931.

Patience Pays

"Among mortals second thoughts are wisest."—EURIPIDES.

IN THE NATION'S CAPITAL

Concluded from page 18

very effectively answers the arguments of those who have contended that utility companies have no special right to occupy highway rights-of-way, no matter how long their lines have been located there. Those who make this argument take the view that utility companies are only tenants by sufferance, so to speak, who can be evicted or sent elsewhere at any time by the state without compensation.

But, as Judge Matson's opinion in the Minnesota case takes note, the use of highway rights-of-way by utility companies is a public use just as much as the use of such highways by vehicles and pedestrians. It is a substitute use, of course. But think of the enormous number of coal trucks, tank cars, messengers, etc., which would have to be pounding the highways if the utility facilities were not there delivering fuel and light and intelligence via electric and gas lines, telephone and telegraph wires, water pipes, etc. We would have to multiply many times the number of highways and the number of vehicles. Under modern conditions the cost would be prohibitive. So, it is really *saving* the state, the taxpayer, and the highway user, good hard money to allow these utility companies to make a more efficient use of a mere fringe of the highway right-of-way for pole lines, pipes, and other facilities.

The opinion by Minnesota Supreme Court Judge Matson further held that where it becomes reasonably necessary to relocate utility facilities upon a highway, in order to improve the highway for public travel (and especially a highway designed to facilitate interstate travel and commerce and to further the common defense), an expenditure of funds to effect such relocation is properly a governmental function exercised for a public purpose of primary benefit to the entire community.

Although gratuities and benevolences of the public moneys in aid of private undertakings are prohibited, the Minnesota Constitution Article 9, Sections 1 and 10, it was held, does not prohibit the legislature from, by prospective action (that is by an enactment prior to the ordering of a relocation of utility facilities or prior to the commencement of a great public work requiring such relocation), fixing the conditions of performance and making provisions for the future recognition of claims for damages founded on equity and justice, although such claims would otherwise be *damnum absque injuria* and unenforceable against the state.

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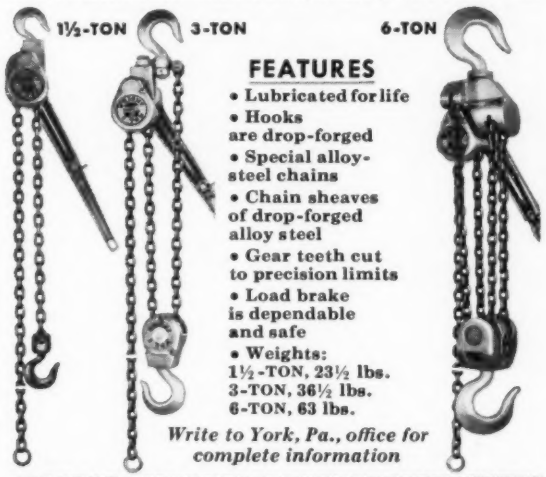

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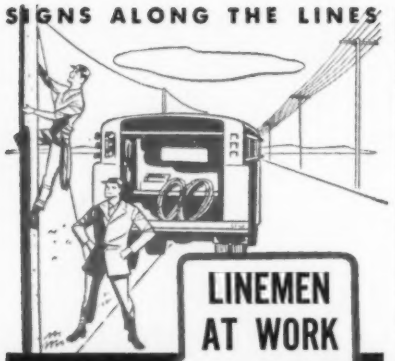

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IMMEDIATE DELIVERY

Mathias A. Klein (left), president and treasurer of Mathias Klein & Sons, Chicago, has announced the election of M. A. Klein Jr. (above, right) as vice president and Richard T. Klein (right) as secretary of the company. Mathias Klein & Sons, in its 101st year, is currently under the management of the third and fourth generations of the Klein family. The company was founded in 1857 by Mathias Klein, grandfather of the present president.

C&D Batteries Adds Five to Sales Staff

Five new men have joined the sales organization of C&D Batteries, Inc., the Conshohocken, Pa., company announced recently. They are James W. Kent, Albert S. Schnyder, Joel Scallen, Robert J. Brown and Arthur F. Crowe.

Mr. Kent is associated with the Hubill Co., C&D's Bettendorf, Ia. sales representatives. He was previously employed by the Clark Equipment Co., Battle Creek, Mich., and the Big River Equipment Co., Davenport, Ia.

After graduating from high school in Battle Creek, Mich., Mr. Kent attended the University of Illinois for two years. He is a member of the Materials Handling Society.

Albert S. Schnyder is associated with Gregory-Salisbury & Co., Inc., C&D's Mobile, Ala. sales representatives. He formerly worked for Minneapolis Honeywell Regulator Co., Lear, Inc., and Chrysler Corp.

A graduate of Southwestern Louisiana Institute with a B.S. in engineering, Mr. Schnyder also did graduate

J. W. KENT

work in electronic engineering at Tulane University.

Joel Scallen will represent the C&D company in the Minneapolis, Minn. area. He is associated with The Battree Co., C&D's Minneapolis sales representatives. Mr. Scallen was previously employed by the William H. Ziegler Co., Minneapolis, the Minneapolis Gas Light Co., and Toltz, King, & Day of St. Paul. He attended the University of Minnesota, studying general engineering.

Robert J. Brown is associated with the Baltimore branch of Charles F. Gross Associates, C&D's Philadelphia sales representatives. He has served in the electronic and radar division of the U. S. Air Force. He was previously employed by Glenn L. Martin Co. as a process writer and planner for the Vanguard project.

Following graduation from Loyola High School, Baltimore, Mr. Brown attended the Universities of Alaska, Baltimore, and San Francisco.

Arthur F. Crowe, associated with Packaged Industrial Power, Inc., C&D's Jersey City, N. J. sales representatives, was formerly employed by National Airlines, Inc., Colonial Airlines, Inc., Grumman Aircraft Engineering Corp., the U. S. Navy, and the U. S. Air Force as a civilian flight line electrician. After graduation from Stuyvesant High School, Mr. Crowe attended New York State University.

JOEL SCALLEN

Build New IT&T Plant In Va. For Components Division

Construction was begun recently on an ultra-modern, one-story plant in Roanoke, Va., for the manufacture of special-purpose vacuum tubes by ITT Components Division of International Telephone & Telegraph Corp.

Ground-breaking ceremonies marked the start of construction of the new plant which will comprise a 58,000-square-foot building, rising on an 18-acre site.

Burrell A. Parkhurst, president of the division, said the plant and its facilities represent a total investment in excess of 3.5 million dollars. When completed, it will house the latest manufacturing equipment and will feature air-conditioned and dust-free assembly rooms to make it among the most modern tube-manufacturing facilities in the world, he added.

The plant is scheduled for completion by the end of 1958 and will be used for the production of traveling-wave tubes, image-storage tubes, and other special-purpose tubes developed in ITT laboratories. Mr. Parkhurst said the plant will employ approximately 350 persons, including engineers, technicians, and other skilled personnel.

Contractor for the structure is C. M. Guest & Co., of Greensboro, N. C. The plant will be leased for 20 years. The new operation represents an expansion of present tube facilities of ITT Components Division, whose headquarters is in Clifton, N. J.

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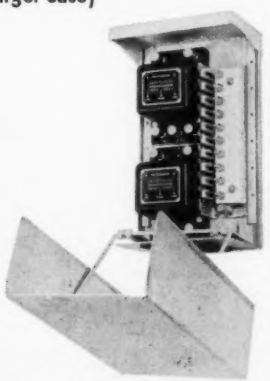
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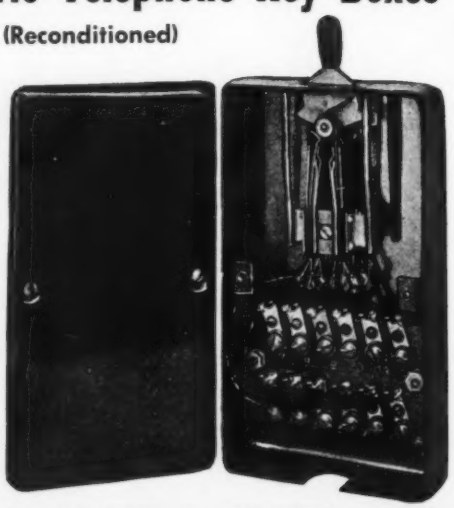

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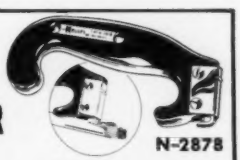

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